Does the medium matter?
Digital vs. paper reading for leisure and foreign language learning

Thesis

in order to acquire the Doctoral Degree in Philosophy

at the Faculty of Humanities of the Georg-August-Universität Göttingen

submitted by

PASQUALINA SORRENTINO

from Nocera Inferiore

GÖTTINGEN 2021

Thesis supervisors:

Prof. Dr. Gerhard Lauer

Prof. Dr. Massimo Salgaro

Abstract

In the last two decades more and more researches were dedicated to the impact of new technology on our everyday life, our learning processes, our reading activities. Digitization become an umbrella term to cover this change. Numerous studies on reading stuck on the purpose to prove empirically the disadvantages or the negative effects of digital devices compared to its analogue counterpart.

This dissertation is a compilation of publications that seek to contribute to a more fact-based debate on future direction in research on digital reading and learning. The experiments reported in this work study the phenomenon of literary reading from different angles not focusing only on analogue-digital divide, but looking at reading as a complex phenomenon embedded in a more complex society. The goal of the experiments, reported here, is to give evidence-based advice how to read and learn in todays' society.

The present work is divided in two sections. In the first part, two studies on literary (e-) reading for recreational purposes are presented. The first experiment investigates whether the readers' attributions of literary value might be affected by the reading support (paper vs. digital), in order to explore whether the paper book still carry a social prestige in the digital society. In the second experiment the factor "age" in relation to digital vs paper reading is investigated. Starting from the metaphor "digital natives/digital immigrants" created in 2001 by Mark Prensky, a study was conducted in order to test its reliability. Particular attention was paid to the investigation of the reading habits and inclination of young and elderly people in relation to literary reading on paper vs. on screen.

The second part of this thesis moves to the educational context and explore the literary reading in a foreign language, here English, and the dictionary use (paper vs digital) in order to learn new words. A particular attention is given to students' dictionary-using habits and to vocabulary acquisition while reading long literary text in a foreign language (English).

The experiments reported in this work, both in the reading for pleasure and in didactic context, give evidence that familiarity with medium and reading habits, were more determinant for the outcomes than the support (paper vs digital) in itself. The results of the following experiments contribute to a more evidence-based debate, so tightly fought in recent years, and are a handout how to support reading and learning in the digital society.

Keywords: digital reading, reading comprehension, reading behaviours, reading habits, vocabulary acquisition, second language

Zusammenfassung

Die Auswirkungen und Folgen der digitalen Techniken auf unseren Alltag, auf die Weise, wie wir lernen und wie wir in Zukunft lesen werden, sind in den letzten beiden Dekaden Gegenstand verschiedener Forschungsanstrengungen. Besonders das Themenfeld Lesen hat eine hohe, nicht zuletzt auch öffentliche Aufmerksamkeit auf sich gezogen. Zahlreiche Studien haben sich zum Ziel gesetzt, die Nachteile oder negativen Auswirkungen digitaler Geräte im Vergleich zu ihrem analogen Pendant empirisch zu belegen.

Die vorliegende Dissertation ist Teil dieser Forschungsanstrengung. Sie versammelt eine Reihe von einzelnen Experimenten zum Lesen und Lernen im digitalen Zeitalter und versteht sich als ein Beitrag zur Versachlichung der Debatte über die zukünftige Ausrichtung der Forschung zum digitalen Lesen und Lernen. Die in dieser Arbeit berichteten Experimente untersuchen genauer das Phänomen des literarischen Lesens aus verschiedenen Blickwinkeln und konzentrieren sich nicht nur auf die Differenz analog vs. digital. Vielmehr fassen sie das Lesen als ein komplexes Phänomen auf, das in eine komplexe Gesellschaft eingebettet ist.

Die vorliegende Arbeit ist in zwei Teile gegliedert. Im ersten Teil werden zwei Studien zum digitalen Lesen von Literatur zu Freizeit- oder Unterhaltungszwecken vorgestellt. Das erste Experiment untersucht, ob die literarischen Wertzuschreibungen der Leser durch den Leseträger (gedruckt vs. digital) beeinflusst werden, um zu herauszufinden, ob das gedruckte Buch in der digitalen Gesellschaft noch über ein soziales Prestige verfügt. Im zweiten Experiment wird der Faktor Alter in Bezug auf digitales vs. analoges Lesen untersucht. Ausgehend von der 2001 von Mark Prensky geprägten Metapher “digital natives/digital immigrants” wurde eine Studie durchgeführt, um deren Tragfähigkeit zu testen. Besonderes Augenmerk wurde auf die Untersuchung der Lesegewohnheiten und -neigung von jungen und älteren Menschen in Bezug auf das literarische Lesen auf Papier vs. Lesen am Bildschirm gelegt.

Der zweite Teil dieser Arbeit behandelt Fragen der Bildung und untersucht detaillierter das literarische Lesen in einer Fremdsprache, hier dem Englischen, und die Nutzung von gedruckten und digitalen Wörterbüchern, um neue Wörter durch das Lesen von Literatur zu lernen. Besonderes Augenmerk wird auf die Nutzungsgewohnheiten im Umgang mit Wörterbüchern und auf den Wortschatzerwerb beim Lesen langer literarischer Texte in einer Fremdsprache (Englisch) gelegt.

Die in dieser Arbeit berichteten Experimente, sowohl über das Lesen zum Vergnügen als auch über das Lesen im didaktischen Kontext, belegen, dass die Vertrautheit mit dem Medium, die

Lesegewohnheiten und Lesepraxen für die gelingende Lesen und Lernen ausschlaggebender sind als die in der Öffentlichkeit so intensiv diskutierten Formate Druck und Digital. Die Ergebnisse dieser hier versammelten Studien sind daher ein Beitrag zur Versachlichung einer allzu aufgeregt geführten Debatte und eine Handreichung für die Lese- und Lernförderung.

Schlüsselwörter: Digitales Lesen, Leseverstehen, Leseverhalten, Lesegewohnheiten, Wortschatzerwerb, Zweitsprache

Acknowledgments

I would like to thank my advisors, Prof. Dr. Gerhard Lauer and Prof. Dr. Massimo Salgaro, for their mentorship over the last years, and for helping me stay on task. Their expertise was invaluable in formulating the research questions and methodology. Their insightful feedback pushed me to sharpen my thinking and brought my work to a higher level.

I would like to acknowledge all of the wonderful professors and colleagues I have meet in the E-READ Cost Action, who supported and trained me.

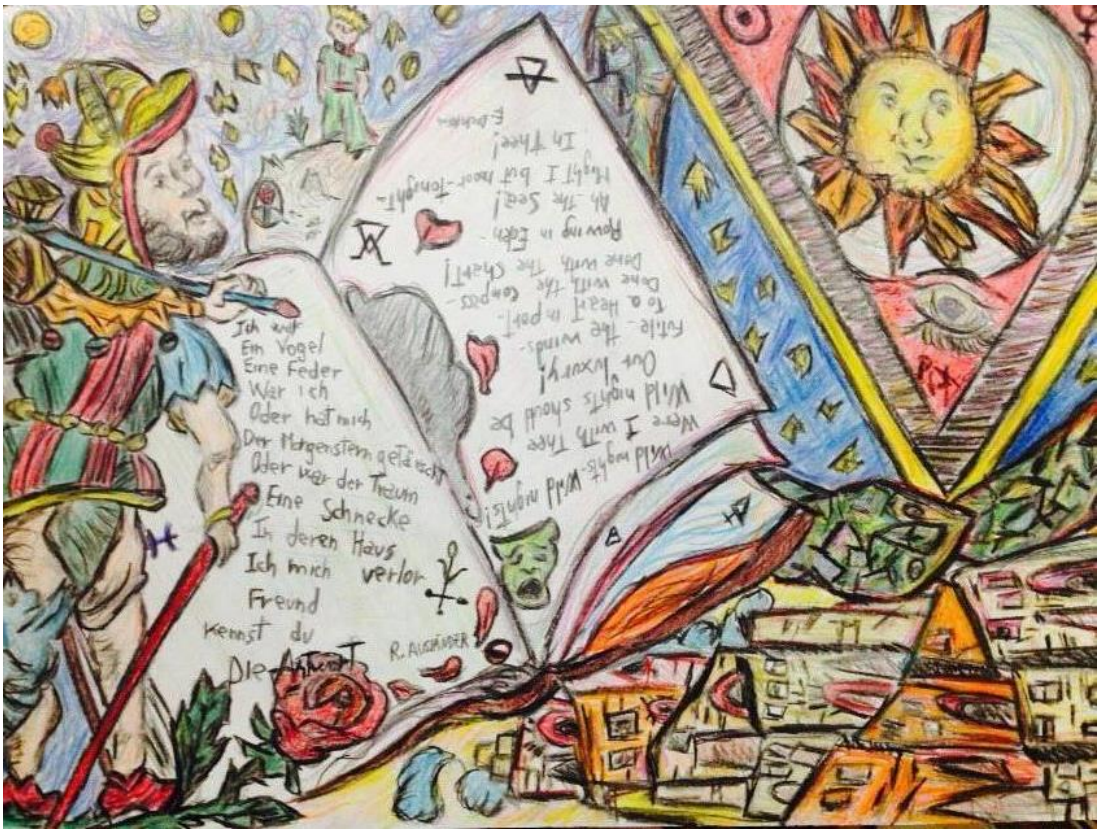
I would especially like to thank the scholarship foundation Cusanuswerk for their support.

Dedica

Questo lavoro lo devo a tante persone straordinarie.

Lo dedico innanzitutto ai miei genitori. A mia madre, in modo particolare, incudine e martello della mia esistenza. A Cirù, che mi ha supportato incondizionatamente durante tutti questi anni e di cui ho sopportato le tremende abitudini alimentari. Alla sua gentilezza d'animo e al suo ottimismo irradianti. A Niels, incontrato nell'ultima parte di questo percorso, a lui, che nonostante la sua memoria di pesce rosso, non scorda mai di credere in me ogni volta che io smetto di farlo.

"Ein japanisches Sprichwort sagt: Nur die Reise ist schön - nicht das Ankommen. Vielleicht liebt man an einer fremden Sprache genau diese Reise. Man macht auf der Reise viele Fehler, aber man kämpft mit der Sprache, man dreht die Wörter nach links und rechts, man arbeitet mit ihr, man entdeckt sie,, (Emine Sevgi Özdamar, Der Hof im Spiegel).



CONTENTS

1. Reading and learning in the digital age. An introduction

During the last years, we have been experiencing digital transformation to different levels in all areas and activities. The outbreak of the coronavirus in China has shocked people around the world and gave a significant push to digitalization showing how it might be crucial in everyday life. New technical solutions are often adopted with little resistance, but in a crisis like this we are living in, new direction must be taken quickly. Students who cannot go to school or university, must be able to continue their education by using digital technology. Employees working from home must be able to continue their jobs remotely and communicate with their colleagues through video conferencing and other remote-meeting tools. And when people are looked up in their home, they must be able to access digital services, entertainment and information as well as remain in contact with family and friends. The new habits we are acquiring might remain in place once the crisis is over.

The rise in popularity of digital devices for reading was indisputable even before COVID-19, both in the didactic as well as in leisure contexts. In particular the migration of school to paperless classroom all over the world is clear evidence (Giebelhausen, 2015; Shishkovskaya et al. 2015). The interest in investigating pupil's learning in the era of digitalization grows in the last decades with particular focus on their use of technologies at home and at school (Sharkins et al. 2016; Chaudron et al. 2018, Pöntinen and Räty-Záborszkyb 2020). Moreover, digital skills are widely recognized to be an essential part of lifelong learning (Ferrari, 2012). Those skills, together with other basic competences that are important in everyday life are expected to be taught and learned at school (Ilomäki et al. 2016), however, according to recent investigations, digital skills are often not well integrated in actual educational system (Voogt et al. 2013). As remarked by Zhang and Kudva (2014) concerning the use and the differences between paper and digital book, there is a need to understand whether they differ in function. If they fulfil the same functions in the same situational context, one may replace the other. However, if they do not, they may simply serve as complements to each other. The future perspective of the printed book is the focus of numerous debates. While Carriere and Eco (2002) conclude that "this is not the end of the book", Gomez (2008) published a startling title declaring 'Print is Dead'. Gomez depicts not less than an irrepressible loss of prestige of print book stating that "relevance and popularity of printed material (such as books, magazines and newspapers) will get smaller and smaller over the next few decades due to digital reading, books themselves will never entirely go away […] (they) will always have a place in millions of homes

across the country, but they will become rare as printers go out of business and warehouses gather dust" (p.176).

Lauer (2020) presents in his book 'Reading in the Digital Age'[1] a different perspective on reading and on the future of the book. Moving from the book history and the history of reading, the author argues against the commonplaces and the simplistic way of addressing the topic by many cultural critics. Lauer offers a closer look at the current (social) reading worlds and argues against the danger of the death of the book and its lack of empirical evidence. "People are reading more than ever before, albeit in ever more formats and engaging media. They no longer look like a conventional book, so that even publishers seem to think that fewer and fewer people are interested in books. This is a wrong conclusion, as a closer look at contemporary reading words reveals"[2] (p.39). According to the literary scholar, the problem is simple: "we do not know with sufficient precision how much and what was read a hundred or fifty years ago. Not only are there no reliable data, there are also no clear categories for comparison that would make it easy to speak of a decline in reading, especially since the few data that are available, some of which are difficult to compare with each other, tend to point in the other direction"[3] (p.43). People have never been surrounded by so many media as they are today, but it doesn't mean that traditional format are on the wane.

Frequently, this line of research and debates is focused mainly on the contrast of reading on paper versus reading online and is object of investigation of many studies over the past couple of decades. However, research results are oft inconsistent. According to some studies there is no differences between reading on screens than on paper in term of reading comprehension (Hermena et al., 2017; Margolin et al, 2013; Porion et al., 2016; Rockinson-Szapkiw et al. 2013). Few studies register an advantage of reading on paper (Golan et al., 2018; Halamish & Elbaz, 2019; Lenhard et al., 2017; Mangen et al., 2013; Singer & Alexander, 2017) whereas other scholars (Aydemir, Öztürk et al., 2013) found that digital reading was better for the comprehension. The meta-analyses conducted by Delgado, Vargas, Ackerman, & Salmeón in 2018 has provided more clarity on this issue. It includes 54 studies published between 2000 and

[1] My translation, original title: Gerhard Lauer, *Lesen in dem Digitalen Zeitalter* (Darmstadt,2020).

[2] *Ibid*. My translation, original:[…] dass mehr denn je gelesen wird, freilich in immer mehr Formaten und Medien. Vieles sieht nicht mehr aus wie ein herkömmliches Buch, so dass es selbst Verlagen so scheint, als würden sich immer weniger Menschen für Bücher interessieren. Das ist ein falscher Schluss, wie ein genauerer Blick in die gegenwärtigen Lesewelten enthüllt.

[3] *Ibid*. My translation, original: Wir wissen nicht hinreichend genau, wie viel und was vor hundert oder vor fünfzig Jahren gelesen wurde. Es fehlen nicht nur belastbare Zahlen, es fehlen auch klare Vergleichskategorien, um so leichthin von Leseverfall reden zu können, zumal die wenigen, teilweise nur schwer miteinander vergleichbaren Zahlen eher in die andere Richtung weisen.

2017, found an advantage of paper over digital reading for the reading of informational, but not for literary texts. On the same line are the results of the meta-analysis on reading performance, reading times and calibration of performance (metacognition) between reading text from paper compared to screens carried out by Virginia Clinton in 2019. The study consisted in a systematic literature search of reports of studies comparing reading from paper and screens in seven databases. It involved 33 studies with 2,799 participants. Significant results were found for reading on paper in both literal and inferential comprehension. The advantages of reading on paper were restricted to expository texts. For fictional texts, generally regarded as easier to read and requiring less background knowledge to understand, no significant difference between both reading supports were reported. According to Clinton, her finding is consistent with the conventional wisdom that digital reading is most suitable for "light pleasure reading". Particular interesting were the findings of calibration accuracy, namely the subjective prediction of reading performance, since subjects were able to evaluate better their performance when they read text on paper compared to screens. Clinton's conclusions redirect to those of previous studies showing that readers may be processing text from screens less efficiently based on poor calibration accuracy, as they think they are understanding the text better than they actually are (Ackerman & Goldsmith, 2011; Sidi et al., 2016), which could lead to detriments in performance when reading from screens (Sidi et al., 2017).

Since the debate on reading in the digital age is still heated also due to the public interest, many aspects of digital reading are uncharted. My research intends to embrace a wider variety of aspects of literary reading in the digital era, namely literary reading for pleasure and for learning foreign language. Furthermore, it presents a sociological reflection on the reasons and preferences for media adoption and try to understand and investigate through empirical studies why people prefer one medium over another and which are the attributes carried out by the reading support.

My work finds its roots in the E-READ (Evolution of reading in the age of digitization) project. The project is a COST Action and started in November 2014, as a collaboration between researchers from all over Europe. The Reading Centre of the University of Stavanger led this EU collaboration. The network brought together nearly 200 scientists, from over 30 countries and with different academic backgrounds, in empirical projects to explore what the screen revolution means for the cultural technique of reading. COST E-READ's goal was to increase awareness about the potential impact of digitization on how we read various types of texts for different purposes. The researchers with a scientific background in psychology, psychiatry, literature, pedagogy, education, linguistics, book history and media science-worked together to

find answers to the questions: "how does reading change when we go from screen to paper and what do we know about the differences between these two ways to read?". After 4 years investigation E-READ has proven that print readers have a stronger understanding of the temporal relationships between events and can recreate the plot of a text more accurately than screen readers. The benefit for reading on print was also found to be greater under time constraints. Additionally, when reading on a screen, readers were more likely to be over-confident of their understanding, especially when they were under time pressure. In the Declaration of Stavanger[4] signed by the E-READ's members it is claimed that "paper remains the preferred reading medium for longer single texts, especially when reading for deeper comprehension and retention, and that paper best supports long-form reading of informational texts."[5] The research also clarifies that "reading long-form texts is invaluable for a number of cognitive achievements, such as concentration, vocabulary building and memory."[6] Such results have been the same across all age groups, levels of education and levels of digital exposure–with the benefit that paper is actually increasing for younger people. E-READ results dispel the myth of "digital native", since younger generations, who were born in the digital age, have shown to read still better on paper.

The current work benefited from the international and interdisciplinary collaboration mentioned above: it sees its beginnings between the university towns of Göttingen and Verona under the supervision of Prof. Dr. Gerhard Lauer and Prof. Dr. Massimo Salgaro. It makes a long, slow and perhaps tortuous journey stopping in Berlin, at the Dahlem Institute for Neuroimaging of Emotion, where Prof. Dr. Arthur Jacobs and Dr. Jana Lüdtke provide the first knowledge of empirical methods and passes through the Radboud University of Nijmegen, where the design of the last study contained in this thesis was carried out under supervision of Prof. Roel Willems.

When we talk about the issue of using screens for reading, we need to try and distinguish between two inextricably connected yet separate (and separable) things. One is the individual reading experience: the concrete case of one person reading one text on one screen device. This is what empirical research naturally gravitates towards. The other is the more general context: the state of affairs in the modern world in which screen-based devices are inescapably interconnected and part of an all-embracing digital infrastructure[7]. As mentioned above,

[4] The Stavanger Declaration is accessible here in 10 languages https://ereadcost.eu/stavanger-declaration/

[5] *Ibid*.

[6] *Ibid.*

[7] Adrian van der Weel, "Behind the screen looms a new Gutenberg revolution", *TXT*, 2020, pp.1-8.

numerous studies have investigated the issues related to reading from digital versus paper sources in terms of performance on reading and how the text is read (i.e., the process of reading). The purpose of this dissertation is not only to compare screen vs. print but improve the understanding of the embedded reading in complex social worlds, where digital/non-digital is only one, minor factor. Why reading is as a complex, multifactorial and very social phenomenon is one of the insights of my research. In order to do that look the "social prestige" carried out by the reading support is investigated in two contexts: 1) literary reading for recreational purposes 2) literary reading in a foreign language (English) for vocabulary acquisition. This division reflects the structure of this thesis, which presents in the first chapter the concept of "social prestige". Chapters two and three focus on the operationalization of that concept by presenting an experiment carried out on that topic. Chapters four and five represent a connecting bridge to the second part of this work by discussing the empirical evidence of the Prenskian popular notion "digital natives" in the literary reading context. The second part of this thesis (chapters six and seven) moves to the educational context and explore the literary reading in a foreign language (English) and the dictionary use (paper vs digital) in order to learn new vocabulary. In the final part, I draw conclusions based on the major findings and try to preview on the many research task to be carry out in future reading research, since nothing is surer that reading will not diminish but find new ways to flourish.

Bibliography

Ackerman, R., & Goldsmith, M. 2011. “Metacognitive regulation of text learning: On screen versus on paper”. *Journal of Experimental Psychology: Applied,* 17, 18–32.

Aydemir, Z., Oztürk, E., & Horzum, M. B. 2013. “The effect of reading from screen on the 5th grade elementary students’ level of reading comprehension on informative and narrative type of texts”. *Educational Sciences: Theory and Practice*, 13(4), 2272–2276.

Carriere, J. C. & Eco, U. 2002. *This is not the end of the book*, London: Harvill Secker.

Chaudron, S., Di Gioia, R., & Gemo, M. 2018. “Young children (0–8) and digital Technology, a qualitative study across Europe”. *JRC Science for Policy Repot. EUR 29070,* Luxembourg.doi:10.2760/294383.

Clinton, V. 2019. “Reading from paper compared to screens: A systematic review and meta-analysis”. *Journal of Research in Reading*, 42, 288-325.

Delgado, P., Vargas, C., Ackerman, R., & Salmeron, L. 2018. “Don’t throw away your printed books: A meta-analysis on the effects of reading media on reading comprehension”. *Educational Research Review*, 25, 23–38.

Ferrari, A. 2012. “Digital competence in practice: An analysis of frameworks”. *JRC Technical Reports*. Luxembourg: European Commission.

Giebelhausen, R. 2015. “The paperless music classroom”. *General Music Toda*y, 29(2),45–49.

Golan, D. D., Barzillai, M., & Katzir, T. 2018. “The effect of presentation mode on children’s reading preferences, performance, and self-evaluations”. *Computers & Education,* 126, 346–358.

Gomez, J. 2008. *Print is dead: books in our digital age*, New York: Macmillan.

Halamish, V., & Elbaz, E. 2019. “Children’s reading comprehension and metacomprehension on screen versus on paper”. *Computers & Education*, 145.

Hermena, E. W., Sheen, M., AlJassmi, M., AlFalasi, K., AlMatroushi, M., & Jordan, T. R. 2017. “Reading rate and comprehension for text presented on tablet and paper: Evidence from Arabic”. *Frontiers in Psychology*, 8, 257.

Ilomäki, L., Paavola, S., Lakkala, M., & Kantosalo, A. 2016. “Digital competence – an emergent boundary concept for policy and educational research”. *Education and Information Technologies* 21 (3): 655–679.

Lauer, G.2020. *Lesen im digitalen Zeitalter*. Darmstadt.

Lenhard, W., Schroeders, U., & Lenhard, A. 2017. “Equivalence of screen versus print reading comprehension depends on task complexity and proficiency”. *Discourse Processes*, 54(5–6), 427–445.

Mangen, A., Walgermo, B. R., & Brønnick, K. 2013. “Reading linear texts on paper vs. computer screens: Effects on reading comprehension”. *International Journal of Educational Research*, 58, 61–68.

Margolin, S. J., Driscoll, C., Toland, M. J., & Kegler, J. L. 2013. “E-readers, computer screens, or paper: Does reading comprehension change across media platforms?” *Applied Cognitive Psychology*, 27(4), 512–519.

Porion, A., Aparicio, X., Megalakaki, O., Robert, A., & Baccino, T. 2016. “The impact of paper-based versus computerized presentation on text comprehension and memorization”. *Computers in Human Behavior*, 54, 569–579.

Pöntinen, S. and S. Räty-Záborszky. 2020. “Pedagogical aspects to support students’ evolving digital competence at school”. *European Early Childhood Education Research Journal*, 28:2, 182-196.

Rockinson-Szapkiw, A. J., Courduff, J., Carter, K., & Bennett, D. 2013. “Electronic versus traditional print textbooks: A comparison study on the influence of university students’ learning”. *Computers & Education*, 63, 259–266.

Sharkins, K. A., Newton, A. B., Albaiz, N. E. A. & Ernest, J. M. 2016. “Preschool children’s exposure to media, technology, and screen time: Perspectives of caregivers from three early childcare settings”. *Early Childhood Education Journal*, 44(5), 437–444.

Shishkovskaya, J., Sokolova, E., & Chernaya, A. 2015. “Paperless” foreign languages teaching”. *Procedia: Social and Behavioral Sciences*, 206, 232–235.

Sidi, Y., Ophir, Y. & Ackerman, R. 2016. “Generalizing screen inferiority- Does the medium, screen versus paper, affect performance even with brief tasks?” *Metacognition and Learning*, 11(1), 15–33.

Sidi, Y., Shpigelman, M., Zalmanov, H. & Ackerman, R. 2017. “Understanding metacognitive inferiority on screen by exposing cues for depth of processing”. *Learning and Instruction*, 51, 61–73.

Singer, L. M., & Alexander, P. A. 2017. “Reading across mediums: Effects of reading digital and print texts on comprehension and calibration”. *The Journal of Experimental Education*, 85(1), 155–172.

Voogt, J., Erstad, O., Dede, C., & Mishra, P. 2013. “Challenges to learning and schooling in the digital networked world of the 21st century”. *Journal of Computer Assisted Learning*, 29(5), 403–413.

Weel, A. 2020. “Behind the screen looms a new Gutenberg revolution”. *TXT Magazine*. 1-8.

Zhang, Y. & Kudva, S. 2014. “E-books versus print books: Readers’ choices and preferences across contexts”. *Journal of the Association for Information Science and Technology*, 65(8), 1695–1706.

Sitography

https://ereadcost.eu/stavanger-declaration/ accessed 19/03/2020.

PART I: Digital reading and social prestige

1.1. What do the value and social prestige of a book in the digital age mean?

With the rise of digital consumption, marketing researchers are more and more the interest in consumer behaviour and in technology implications for human society. Investigating and understanding why consumers prefer digital over physical formats is not only relevant for marketers in industries that commercialize music, books and other information products (Magaudda, 2011) but also for marketers in general as digital tools become integrated in more consumer products. According to Belk (2013), comparing how, why and to what extent consumers might choose the physical version instead its digital correlate, is crucial to understand wheatear dematerialized photos, books, newspaper, songs, have the same value in consumer's lives as its material counterpart. Consumer choice results from multiple value components, a value perspective can enlighten the extent to which these components impact a particular consumer decision. The concept of perceived value might help to understand their preference for a digital or a physical product format. Following chapter presents an exploratory comparative study of the value consumers-readers perceive in the digital versus the paper books context. Exposing how readers conceptualize value with regard to digital and paper books, this research adds to the literature by comparing relevant value categories for digital versus paper reading support. It deals with social prestige of paper book in the digital society and try to find out whether in the age of digital deterioration, the materiality of a book plays still a significant role for the readers or the digitalisation process has marginalised the concept of original. In order to do that, the study presented in following chapter will investigate the value of a literary work looking at its form (paper vs digital) and its content. It aims to find out whether readers evaluation of a literary work might be affected by the presentation medium, on which the literary text is provided.

Bibliography

Belk, R. 2013. “Extended self in a digital world”, in: *Journal of Consumer Research*, Vol. 40, No. 3, pp. 477-500.

Magaudda, P. 2011. “Digital music consumption practices in the age of dematerialization”, in: *Journal of Consumer Culture*, Vol. 11, No. 1, pp. 15-36.

2. How to measure the social prestige of a Nobel Prize in Literature? Development of a scale assessing the literary value of a text

Prof. Dr. Massimo Salgaro
Associate Professor at University of Verona/Fellow at Institute for Advanced Study, Paris∗
Pasqualina Sorrentino MA
PhD at University of Göttingen
Prof. Dr. Gerhard Lauer
Professor of Digital Humanities at University of Basel
Dr. Jana Lüdtke
Researcher at the Center for Applied Neuroscience at Free University of Berlin
Prof. Dr. Arthur M. Jacobs
Professor of Applied Neuroscience at Free University of Berlin

Abstract

Starting from Walter Benjamin's definition of aura as an 'effect of a work of art being uniquely present in time and space', the objective of this study is to test whether paper books and e-books have different kinds of "aura" and if so, whether the perception of the aura influences the evaluation of the literary texts within a book and an e-book. 59 subjects read four texts from two different genres (short stories and poems) on two different devices (antique book and Kindle). To determine the effect of aura we developed a questionnaire to measure the evaluation of the literary quality by readers. Results show different attributions of literary value depending on the reading device and on the genre of the text. Despite the study's limitations, these findings support the notion that the context, i.e. the preconceptions of the readers towards a certain medium of reading, plays a determinant role in the attribution of literary value.

Keywords: *digitality; literary evaluation; materiality; Nobel Prize; reading research*

∗This article benefitted from a fellowship at the Paris Institute for Advanced Studies (France), with the financial support of the French State, programme "Investissements d'avenir", managed by the Agence Nationale de la Recherche (ANR-11-LABX-0027-01 Labex RFIEA.

2.1. What is aura or the social prestige of literature?

We are living in the era of the third "reading revolution".[8] After the invention of writing, 6.000 years ago, and of the Gutenberg printing press in the 15th century, the introduction of digital texts and the arrival of the Kindle in 2007 is changing our reading minds. This change is of pivotal importance since writing has made our human knowledge and culture visible and storable. At least the Western culture is based on the "Order of the Book".[9]

A similar medial revolution we are experiencing nowadays happened in the beginning of the 20th century, when radio, film, and photography were invented. To describe the consequence of this revolution on our interaction with objects, Walter Benjamin introduced the concept of aura in his 1936 essay *The Work of Art in the Age of Mechanical Reproduction* (German: *Das Kunstwerk im Zeitalter seiner technischen Reproduzierbarkeit*). Benjamin discusses the concept of aura to describe the authenticity of an artwork which gets lost by its reproduction. According to the philosopher, 'even the most perfect reproduction of a work of art is lacking in one element: its presence in time and space, its unique existence at the place where it happens to be'.[10] Benjamin understood the aura of a work as a "distance effect" in the sense that the object perceived is placed at a certain temporal and spatial realm separated from its intended public. The distance legitimates a certain authority to the artwork and social prestige to its owners or interpreters. According to Benjamin, the modern reproduction techniques such as cinema, photography and phonograph, nullify the distance between the original work of art and its recipients. For this reason, the aura, the unique aesthetic authority of an artwork given by its existence in a specific time and space is lost in the age of mechanical reproduction.

A similar loss of distance and authority is experienced nowadays through digitalization. With the invention of printing, the aura of a text reproduced in a unique manuscript has already been compromised because, as Van der Weel states: 'with every cheap edition of the classics ever published something of the "aura" of the original artwork was lost'.[11] In this way, Van der Weel transfers the concept of aura from the artistic and pictorial field into the literary one, where the status of text is inevitably threatened by the digital environment because 'the digital medium

[8] R. Darnton, 'History of Reading', in Peter Burke (ed.), *New Perspectives on Historical Writing* (Cambridge, 1991), p. 148.

[9] A. Van der Weel, *Changing Our Textual Minds: Towards a Digital Order of Knowledge* (Manchester: Manchester University Press, 2011), p. 2.

[10] W. Benjamin, 'The Work of Art in the Age of Mechanical Reproduction', *Illuminations* (trans. Harry Zohn, Fontana, London, 1970), p. 220.

[11] A. Van der Weel, *Changing Our Textual Minds*, p. 181.

has marginalized the notion of the original'. Hence, digital copies cannot be distinguished from the original.[12] In a digital environment, a literary text runs always the risk of "digital obsolescence"[13] i.e. the deterioration of the materiality. For Van der Weel, 'all digital texts, regardless of provenance or quality, look identical',[14] as they miss the typical paratextual qualities of paper books given by typography, cover, size, color, etc.

In the art market, the original painting has an immense social economic and cultural value compared to its copy. Consequently, the aura of the original implicates a higher social prestige. Following the parallelism between the artistic and the literary field mentioned above, we postulate that the high symbolic value attributed to books is higher than that of e-books. With our experiment we wanted to empirically test Benjamin's thesis of "the loss of aura" in relation to the evaluation of literary works among contemporary readers. We asked if contemporary readers attribute different values of literary quality to a text depending on the device used to present the text (antique book vs e-reader). Based on Van der Weel's and Benjamin's thesis, we made the hypothesis that contemporary readers evaluate the social prestige for literary texts higher when texts are presented in a paper book compared to a digital version presented on an e-reader. We also tested whether this effect could be observed for different genres (short story vs. poem).

2.2. How can we measure the aura of a book? The study's design

To our knowledge, the social prestige of a text has never been empirically tested before, and since no adequate questionnaire to measure it exists, we create a suitable one starting from the literary evaluation model of Renate von Heydebrand and Simone Winko.[15] The concept of value developed by Heydebrand and Winko to denote 'a complex social act by which a subject attributes value to an object [e.g. a book], in a concrete situation and on the basis of a certain standard of value and certain categorizing assumptions'.[16] Consequently, following the thesis of Heydebrand and Winko, a literary text is not intrinsically valuable, it only acquires an attributive value in relation to standards of value. For example, for cultivated readers, a "good"

[12] *Ibidem,* pp. 181-182.

[13] *Ibidem,* p. 181.

[14] *Ibidem,* p. 186.

[15] R. von Heydebrand & S. Winko, *Einführung in die Wertung von Literatur* (author's trans. Introduction in the Literary Evaluation, Munich: Schöningh, 1996), pp. 111-131.

[16] R. von Heydebrand & S. Winko, 'The Qualities of Literatures: A Concept of Literary Evaluation', in: W. van Peer (ed.), *The Quality of Literature: Studies in Literary Evaluation* (Amsterdam & Philadelphia: John Benjamins Publishing Company, 2008), pp. 226.

book should be "complex" or "rhetorically elaborated" to meet their expectations (values), whilst for less sophisticated readers, a "good" book can be a "suspenseful" love story or detective novel. As Heydebrand and Winko point out, 'literary evaluation is by no means limited by professional judgment on literary texts'.[17] It takes place in a complex social system and plays a role in the production, distribution, and reception of literature. Individuals evaluate literature implicitly by selecting particular texts considered worthy of attention. For example, this occurs when literary critics consider a text a part of the canon, when a teacher selects a text for his/her syllabus, or an important publishing house chooses a text for a particular book series. There can be a number of reasons to trigger these evaluation acts including aesthetic, educational, but also economic reasons since assessment of literary quality is governed by norms influenced by economic and cultural spheres. The latter regulates 'the possible gains in terms of knowledge, action orientation, gratification, prestige'.[18] The model looks into two distinct forms of literary evaluation: explicit verbal utterances, and non-linguistic acts of selection (e.g. buying a book instead of another). In the structural typology of axiological textual values, the standards of value are governed by four dimensions: formal values, content values, relational values, reception values. While the first three take place on the social level, the fourth takes place on the individual level. In this study, we focused on the reception values, because we were interested in testing experimentally the effect of the texts. Among reception values, Heydebrand and Winko propose the following sub-categorization:

1) *Individual values*. This sub-dimension considers the qualitative offer of literary texts for personal needs[19] and it includes:
    1. Cognitive value (reflection, memorability).
    2. Practical value (making sense, significance).
    3. Hedonistic value (pleasure, entertainment).
2) *Social value.* This aspect observes the "use" of literary texts on two fronts:
    1. Economic value: medium for money. This value captures literary products as objects of the economic system.
    2. Social prestige. This value represents symbolic capital and the gain in prestige amongst literature in general, or within particular texts.

[17] *Ibidem,* p. 225.

[18] *Ibidem,* p. 230.

[19] R. von Heydebrand & S. Winko, *Einführung in die Wertung von Literatur*, pp. 111-131.

Following this categorization, we created an instrument to measure the literary value perceived by the single reader. In contrast to the subcategories for social values, the categories and subcategories for individual values overlap with existing subscales from questionnaires developed to assess reading experiences. Hence, we have borrowed existing items from scales like the poetry reception questionnaire,[20] the experiencing questionnaire,[21] the foregrounding questionnaire,[22] the reading experience questionnaire,[23] and the transportation scale[24] to construct the three subscales to measure individual's value:

Cognitive value

- I think, the text/ poem introduces a new perspective.[25]
- The text/ poem makes me look at things differently.[26]
- The subject of the text/ the poem concerns questions which I oft thought.[27]
- The text/ poem makes me stop and think.[28]

Practical value

- I felt that some aspects of the text/ the poem are important for my everyday life too.[29]
- This text/ poem continued to influence my mood after I finished reading it.[30]
- After reading it was easy to concentrate again on other things.[31]
- After reading this text/ poem I felt refreshed, renewed, and revitalized.[32]

[20] J. Lüdtke, B. Meyer-Sickendieck & A. M. Jacobs, 'Immersing in the stillness of an early morning: Testing the mood empathy hypothesis of poetry reception', *Psychology of Aesthetics, Creativity, and the Arts*, 8 (2014), pp. 363-377.

[21] D. Kuiken, P. Campbell & P. Sopčák, 'The Experiencing Questionnaire: Locating exceptional reading moments', *Scientific Study of Literature*, 2 (2012), pp. 243–272.

[22] W.Van Peer, J. Hakemulder & S. Zyngier, 'Lines on feeling: foregrounding, aesthetics and meaning', *Language and Literature*, 16 (2007), pp. 197-213.

[23] M. Appel, E. Koch, M. Schreier et al., 'Aspekte des Leseerlebens: Skalenentwicklung', *Zeitschrift für Medienpsychologie*, 14 (2002), pp. 149-154.

[24] M.C. Green & T.C. Brock, 'The Role of Transportation in the Persuasiveness of Public Narratives', *Journal of Personality and Social Psychology*, 79 (2000), pp. 701-721.

[25] W. Van Peer, J. Hakemulder & S. Zyngier, 'Lines on feeling: foregrounding, aesthetics and meaning', pp. 197-213.

[26] *Ibidem.*

[27] M. Appel, E. Koch, M. Schreier et al., 'Aspekte des Leseerlebens: Skalenentwicklung', pp. 149-154.

[28] W. Van Peer, J. Hakemulder & S. Zyngier, 'Lines on feeling: foregrounding, aesthetics and meaning', pp. 197-213.

[29] M. Appel, E. Koch, M. Schreier et al., 'Aspekte des Leseerlebens: Skalenentwicklung', pp. 149-154.

[30] *Ibidem.*

[31] M.C. Green & T.C. Brock, 'The Role of Transportation in the Persuasiveness of Public Narratives', pp. 701-721.

[32] M. Appel, E. Koch, M. Schreier et al., 'Aspekte des Leseerlebens: Skalenentwicklung', pp. 149-154.

Hedonistic value

- While reading the text/ poem I have noticed the language.[33]
- The text/ poem is fascinating.[34]
- It is a worth reading this text/ poem.[35]

We created, independently from the model of Heydebrand and Winko, the following items related to the economic value and of the social prestige, as we did not find any model to refer to:

Economic value

Prose condition:

A German book publisher paid 5,000 euros for the rights of a Günter Grass anthology, another publisher paid 200 euros for the rights of an Oswald Wiener anthology. How much did a German publisher pay for the rights of the anthology which contains the text you have just read? Answer scale: 1 (€ 200.-) - 5 (€ 5,000.-)

Poem condition:

A German book publisher paid € 5,000.- for the rights of an Erich Fried anthology, another publisher paid € 200.- for the rights of a Friedrich Achleitner anthology. How much did a German publisher pay for the rights of the anthology which contains the poem you have just read? Answer scale: 1 (€ 200.-) - 5 (€ 5,000.-)

Social prestige

- Do you think that this text/ poem won a literary prize?
- Do you think that the literary critics rated this text as an important text/ poem?
- Do you think that this text/ poem should be taught in school?
- Do you find this text/ poem trivial?

All items were presented together with a 5-point Likert scale ranging from -2 (completely disagree) to 2 (completely agree). The items of the economic value and of the social prestige are the most important values related to our question on the literary value of a text as they explicitly operationalize the category of social prestige introduced by Heydebrand and Winko.

[33] *Ibidem.*

[34] J. Lüdtke, B. Meyer-Sickendieck & A. M. Jacobs, 'Immersing in the stillness of an early morning', pp. 363-377.

[35] *Ibidem.*

Furthermore, in order to test the attentiveness and the quality of reading of our participants, we designed two memory tests, one on the formal aspects, and one on the content aspects of the texts. For the memorability of the formal aspects, the subjects had to fill in blanks in quotations of the text which they had just read, e.g.: "How (holy) is the mother's pleasance" ("Wie (heilig) ist die Mutterwonne"). For the content, participants had to reply to questions like the following, choosing between 4 possible answers: "Where did the tourists come from? India, Italy, USA, France (correct answer: USA)".

2.3. Methods

Participants

We tested 59 subjects (37 women, 22 men) with a different background and aged between 18 and 70 years old, in the cities of Göttingen, Northeim, Nörten-Hardenberg, Berlin, and Uslar. Forty-nine participated without re-imbursement, the remaining ten were volunteers who participated for compensation. Inclusion criteria for study participation was German as a native language.

Design

The aura study has an articulated 2x2 design with each participant receiving each text genre presented on two different presentation mediums. Each subject reads two prose texts, one on paper and one on screen, and two poems, also one on paper and one on screen. The order of the texts, the genres, and the medium was counterbalanced in order to minimize genre changes. Thereby, the two short stories and the two poems were always presented directly one after the other.

Reading materials

The prose texts chosen for the experiment were two German translations of Ernest Hemingway's *Cat in the rain* and *A day's wait* from the same collection. The two poems written by the German writer Wilhelm Hauff are entitled *Mother's love* and *Wilhelm to his dear mother on her birthday*. We selected the above-mentioned prose texts and poems because they are not particularly difficult to comprehend, they do not include words and rhetorical figures that are particularly rare or difficult. The stories by Hemingway tell two very simple stories, an encounter with a cat during an accommodation in a hotel and an episode during the Second World War. The poems are focused on a very simple love of a son for his mother. In the paper

version, the book had a hard-cover and looked very antique although the typographic characters used were not gothic, but contemporary characters, in order to avoid making the reading task difficult for those readers who were not familiar with black letters. The electronic and the paper version were presented in a very similar layout. For both versions of a text, the same amount of text was presented on a page. The page breaks appeared on identical positions of the text.

Procedures

Participants were told that they were going to read four texts: two short stories and two poems. After each reading session they had to answer the memory questions and fill out the aura questionnaire. The items of the memory tests and the questions from the aura questionnaire were presented on a computer screen via the online platform SoSci Survey.[36] The presentation of the texts is described in the Material section. At the end of the study, participants were asked to fill out an additional questionnaire related to their reading habits. The participants' task was not time constrained. During reading they were told that they could go back and forth in the text as they wished, while total reading time was measured. During the question part, they could not go back to the text.

2.4. Results

In the first step, reliability analyses were conducted, which evaluated the six subscales of the aura questionnaire. If necessary, items were recoded, so that high numbers indicate high value for the underling construct. For the subscales hedonic value (hv) and practical value (pv), one item had to be removed (hv – item one, pv – item three). In the end, coefficient alpha reliabilities ranged between .69 and .84, indicating that the remaining items formed consistent subscales. In subsequent analyses, these subscales were used to study effects of medium and genre. To do this, a 2x2 repeated measure ANOVA was run for each subscale, with medium (book vs Kindle) and genre (poetry vs prose) as the two independent variables. Additionally, we also conducted these 2x2 ANOVA for the memorability items. The mean values and standard deviations for both memorability values, and the subscales from the aura questionnaire are reported in Table 1.

[36] D.J. Leiner, 'SoSci Survey' (Computer software, Version 2.5.00-i), <https://www.soscisurvey.de> (19 January 2018).

	independent variables *genre* and *medium*			
	poem		short story	
	antique book	e-reader	antique book	e-reader
Dependent variables	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*
content memorability	2.69 (1.27)	2.97 (1.21)	3.69 (0.50)	3.73 (0.45)
form memorability	1.24 (1.32)	1.19 (1.22)	3.64 (2.15)	3.81 (2.12)
cognitive value	2.59 (0.95)	2.56 (0.94)	2.89 (1.04)	2.74 (0.97)
hedonic value	2.86 (1.03)	2.89 (1.05)	3.56 (0.89)	3.22 (1.07)
practical value	3.50 (0.84)	3.51 (0.94)	3.10 (0.90)	3.25 (0.91)
economic value	3.80 (1.67)	3.63 (1.54)	4.25 (1.52)	3.83 (1.68)
social prestige	2.63 (0.76)	2.97 (0.79)	3.12 (0.77)	3.04 (0.84)

Table 1: Mean values and standard deviations for each subscale

Memorability measures

The analysis for both memorability measures for form and the form content revealed a significant effect for genre (form: $F(1,61.1)=150.6$, $p<.001$, content: $F(1,57.7)=58.5$, $p<.001$), indicating better memorability for prose texts compared to the poems. Neither the main effect for medium nor the interaction were significant (all $F < 1.7$, all $p > .19$).

Effects of genre: prose vs. poetry

The main effect for genre was significant on four of the five subscales (all $F>4.9$, all $p<.04$). Only for the economic value, no significant effect could be observed ($F(1,59.1) =2.3$, $p=.13$). For social prestige ($Mean_{short\ story}=3.08$, $Mean_{poem}=2.82$), hedonic value ($Mean_{short\ story}=3.39$, $Mean_{poem}=2.88$), and cognitive value ($Mean_{short\ story}=2.81$, $Mean_{poem}=2.57$) the study participants rated short stories higher compared to the poems. On the subscale practical value, the participants reported higher values for poems compared to the short stories ($Mean_{short\ story}=3.17$, $Mean_{poem}=3.51$). With the exception of practical value, the results indicate that evaluation of the literary quality of the two stimuli are in line with that of literary critics and literary historians made on the works of Hemingway and Hauff in the past. A

possible explanation could be Hauff's trivial treatment of the mother's love as a topic which makes it worthy and accessible to everybody.

For the subscale social prestige (cf. Figure 1), a significant interaction between genre and medium could be observed (F (1, 55.8) =4.4, p=.04). These effects indicate that the genre difference was significant only for conditions in which the texts were presented in an antique book (t (54) =3.38, p<.001), but not for conditions with e-readers (t<1). No further interactions were significant (all F > 1). It seems that for our readers it made a difference if they read the poem or the prose on the screen or on paper. As the graph shows, when the text was read on paper, the readers were more prone to think that the text should be taught in school, that it had been praised by literary critics, or that it was written by a Nobel Prize author.

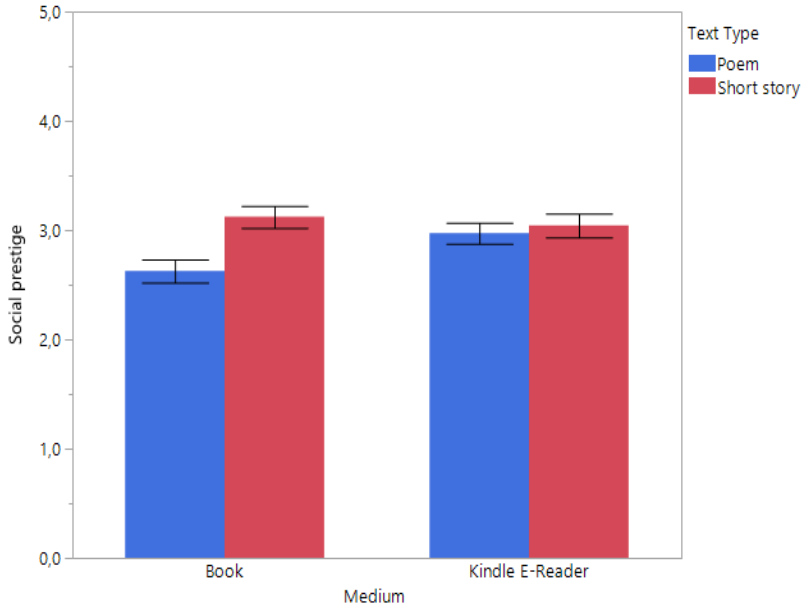


Figure 1: Genre and medium effects for the subscale Social prestige.

Effects of medium: antique book vs. e-reader

The main effect for medium was significant only for the subscale economic value (cf. figure 2). Here, the economic value was rated higher for texts presented in an antique book compared to texts presented on an e-reader (F (1,59.1) =4.6, p=.04; $Mean_{\text{antique book}}$=4.04, $Mean_{e\text{-reader}}$=3.72). For all other scales, no effect of medium could be observed (all F<2.4, all p>.12).

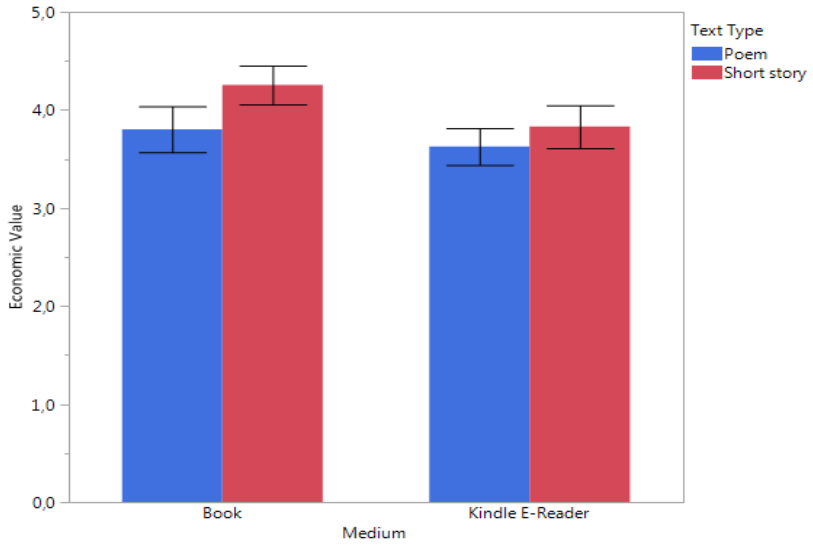


Figure 2: Genre and medium effects for the subscale economic value.

2.5. Discussion

We chose two short stories by a Nobel Prize winner, Ernest Hemingway, and two poems by a romantic writer almost unknown to today's readers, Wilhelm Hauff. The texts not only have different social prestige but were also written in two different historical periods and, therefore, entail different temporal distance towards today's readers. In fact, while the prose of Hemingway is very plain, the two poems are written in easy and understandable, but very rhetorical and old-fashioned German. All these factors seem to have impacted the readers, who, in their judgment, consistently show that they attributed higher "literary value" to the prose text than to the poems. One limitation of our results is that the perceived difference in social prestige between poems and prose puts in relation two different text genres and two very diverse authors who lived in a different historical and cultural period. The imbalance between the literary quality of the poems and that of the prose texts was so strong that the aura our readers grasped was not that of the paper book, as opposed to the screen, but that of a text by a Nobel Prize winner, as opposed to that of an almost forgotten author. More consistent would be a comparison between texts of the same genre and written by the same author or by coeval authors. This difference in the literary quality obscured most of the other factors related to the digital medium. Nevertheless, we found a significant effect in the interaction between the medium and the text type in the social value, and a clear effect of the medium in the evaluation of the economic value. Despite its limitations, these results foster our hypothesis that the

context, i.e. the positive preconceptions of the readers towards a certain reading, play a determinant role in the attribution of literary value. Previous research on literary reading has shown that three elements are central in the recently elaborated Neurocognitive Poetics model of literary reading (Jacobs, 2015): the text, the reader, and the context. Our research takes a unique place in highlighting the importance of the context that is the material support of the text, in the evaluation of a literary text. Following the results of our study, it seems that the famous claim by Marshall McLuhan that the medium is the message does apply for our experiment, as readers focused not only on the content and quality of the message, i.e. the literary text, but also on the "aura" of the medium they read the text on.

Bibliography

Appel, M., E. Koch, Schreier, M. & Groeben N. (2002). Aspekte des Leseerlebens: Skalenentwicklung. *Zeitschrift für Medienpsychologie*, 14, 149-154.

Benjamin, W. (1970). The Work of Art in the Age of Mechanical Reproduction. In: *Illuminations*, trans. Harry Zohn, Fontana, London, 224-225.

Darnton R. (1991). History of Reading. In Peter Burke (ed.), *New Perspectives on Historical Writing*. Cambridge, 148.

Green, M.C. & Brock, T.C. (2000). The Role of Transportation in the Persuasiveness of Public Narratives. *Journal of Personality and Social Psychology*, 79. 701-721.

Heydebrand, R. von & Winko, S. (1996). *Einführung in die Wertung von Literatur: Systematik - Geschichte - Legitimation*. Paderborn: Schöningh.

Heydebrand, R. von & Winko, S. (2008). The Qualities of Literatures: A Concept of Literary Evaluation. In: W. van Peer (ed.), *The Quality of Literature: Studies in Literary Evaluation*. Amsterdam & Philadelphia: John Benjamins Publishing Company, 223-239.

Kuiken, D., Campbell, P. & Sopčák, P. (2012). The Experiencing Questionnaire: Locating Exceptional Reading Moments. *Scientific Study of Literature*, 2, 243–272.

Jacobs, A. M. (2015). Towards a Neurocognitive Poetics Model of Literary Reading. In: R. M. Willems (ed.), *Cognitive Neuroscience of Natural Language Use*. Cambridge & New York: Cambridge University Press, 135-159.

Leiner, D. J., SoSci Survey, (Computer software, Version 2.5.00-i), <https://www.soscisurvey.de> (19 January 2018).

Lüdtke, J., Meyer-Sickendieck, B. & Jacobs, A. M. (2014). Immersing in the Stillness of an Early Morning: Testing the Mood Empathy Hypothesis of Poetry Reception. *Psychology of Aesthetics, Creativity, and the Arts*, 8, 363-377.

Mangen, A. & van der Weel, A. (2016). The Evolution of Reading in the Age of Digitization: an Integrative Framework for Reading Research. *Literacy*, 50, 116-124.

Mangen, A. (2016). The Digitization of Literary Reading: Contributions from Empirical Research. *Orbis Litterarum*, 71, 240-262.

Mangen, A. & Kuiken, D. (2014). Lost in the iPad: Narrative Engagement on Paper and Tablet. *Scientific Study of Literature*, 4, 150-177.

Van der Weel, A. (2011). *Changing Our Textual Minds: Towards a Digital Order of Knowledge*. Manchester: Manchester University Press.

Van Peer, W., Hakemulder, J. & Zyngier, S. (2007). Lines on Feeling: Foregrounding, Aesthetics and Meaning. *Language and Literature*, 16, 197-213.

3. How much does the symbolic capital of books cost? Operationalizing the prestige of books in the digital age

Pasqualina Sorrentino, Massimo Salgaro

3.1. Introduction

In their introduction to the present volume, Anthony Enns and Bernhard Metz seek to show how the material aspects of literary texts, such as the cover, binding, and typography, reflect or even determine their cultural status. Recent experimental research seems to confirm this hypothesis by showing that book covers play an important role in the first evaluation of a text.[37] As the history of the literary field shows, the prestige of books is the product of the tension between two competing capitals: symbolic and economic capital.[38] Their relation is inversely proportional, as symbolic capital increases the more economic capital decreases, and vice versa. When books are heavily promoted and consequently popular, for example, they are often perceived as trivial, whereas rare and complex books are more often perceived as serious and therefore prestigious. If, as the editors of the present volume seem to propose, the prestige of books changes depending on variations in book production, then the digital era should have a huge impact on this value.

The rise of the internet is only one aspect of the digital revolution, a technological transformation that has had, and continues to have, a profound impact on the publishing industry. The transformation that has affected the publishing industry at every level of the value chain is reflected by the growth of online retailers like Amazon as well as the much-publicized debates about digital books among literary critics. As Adriaan van der Weel puts it, thanks to digitality we are experiencing the third reading revolution of humanity, which is changing the "Order of the Book" that formed the basis of Western culture.[39] Van der Weel uses Walter Benjamin's concept of "aura" to describe the authority of the print book and the loss of the "aura" to describe the fate of the book in the digital age. This loss is precisely a loss of prestige, which is directly linked to the materiality of books. The digital text threatens the existence of

[37] Arūnas Gudinavičius and Andrius Šuminas, "Choosing a Book By Its Cover: Analysis of a Reader's Choice," *Journal of Documentation* 74, no. 2 (2018): 430-446.

[38] Pierre Bourdieu, *The Rules of Art: Genesis and Structure of the Literary Field*, trans. Susan Emanuel (Stanford: Stanford University Press, 1995).

[39] Adriaan van der Weel, *Changing Our Textual Minds: Towards a Digital Order of Knowledge* (Manchester: Manchester University Press, 2011), 2.

the print book in several ways. First of all, digital copies of a text cannot be distinguished from the original.[40] Secondly, in a digital world, a literary text always runs the risk of "digital obsolescence" (i.e. the deterioration of its materiality).[41] Thirdly, for van der Weel, "all digital texts, regardless of provenance or quality, look identical," as they lack the typical paratextual qualities of print books given by typography, cover, size, color, etc.[42] Following the inverse relationship between symbolic and economic capital, we can argue that in contemporary society the print book represents symbolic capital and the electronic text stands for economic capital. The prestige of books thus depends on their physical appearance, as the distinction between "highbrow" and "lowbrow" books actually has less to do with their content than their material aspects, which differentiate them from cheap editions.[43]

So far this is merely a stimulating socio-cultural theory. We sought to test this theory using empirical research in order to assess whether, for actual readers, paperbound texts have more or less social prestige than digital texts. Based on van der Weel's assertion that digital texts lack an "aura," we hypothesized that contemporary readers would evaluate the social prestige of literary texts higher when they were presented in a print version compared to a digital version on an e-reader. To do this we needed to operationalize the concept of "social prestige", which involved creating a questionnaire to assess how readers perceive print books and e-books.

3.2. Operationalizing the prestige of books

To operationalize a concept means to translate it "from theoretical language to empirical language."[44] This is the definition we find in the *Dictionary of the Social Sciences*: "The process of operationalization consists in transforming an abstract concept of theory into an empirical, testable subject of research. Proper operationalization is therefore crucial to obtaining relevant results and is especially at stake in the formulation of research methods. In sociological research based on surveys or interviews, for example, the construction of the line of questioning is essential."[45] In other words, operationalization is the transformation of a concept into

[40] Ibid., 181-182.

[41] Ibid., 181.

[42] Ibid., 186.

[43] Ellen Gruber Garvey, "Ambivalent Advertising: Books, Prestige, and the Circulation of Publicity," in *A History of the Book in America*, ed. Carl F. Kaestle and Janice Radway, 5 vols. (Chapel Hill: University of North Carolina Press, 2009), 4: 171.

[44] Piergiorgio Corbetta, *Metodologia e Tecniche della Ricerca Sociale* (Bologna: Il Mulino, 2014), 89.

[45] "Operationalization," in *Dictionary of the Social Sciences*, ed. Craig Calhoun (Oxford: Oxford University Press, 2002), see https://www.oxfordreference.com/view/10.1093/acref/9780195123715.001.0001/acref-9780195123715-e-1200?rskey=INdJ7W&result=1200.

empirically observable properties. We start with a clear definition of this term, as we are conscious that quantitative approaches are not common in the humanities, where theoretical (qualitative) approaches prevail. There is also a gap between quantitative and qualitative approaches in the social sciences. For these scholars, the legitimization of quantitative or qualitative analysis depends upon the research object.[46]

"Operationalization" is not limited to the social sciences. Although "it must be the ugliest word"[47] he had ever used, it became fashionable in the humanities since its introduction by Franco Moretti. It has recently reached the field of literary theory as well thanks to Moretti's pithy definition:

> [Operationalization] describes the process whereby concepts are transformed into a series of operations—which, in turn, allow all manner of phenomena to be measured. Operationalizing means building a bridge from concept to measurement, and then to the world. In our case, [the bridge] is from the concepts of literary theory to some form of quantification and then to literary texts.[48]

Moretti is aware that "measurement is a challenge to literary theory,"[49] but he nevertheless sees the potentiality of this process in the current context of digital humanities and "distant reading":

> Digital humanities may not yet have changed the territory of the literary historian, or the reading of individual texts; but operationalizing has certainly changed, and radicalized, our relationship to concepts: it has raised our expectations, by turning concepts into magic spells that can call into being a whole world of empirical data; and it has sharpened our scepticism, because if the data revolt against the creator, then the concept is really in trouble. A theory-driven, data-rich research programme has become imaginable, bent on testing, and, when needed, falsifying the received knowledge of literary study. Of this enterprise, operationalization will be the central ingredient.[50]

[46] Corbetta, *Metodologia*, 70.

[47] Franco Moretti, "Operationalizing," *New Left Review* 84 (November-December 2013): 103-119 (103).

[48] Franco Moretti, "'Operationalizing': or, the Function of Measurement in Modern Literary Theory," *Pamphlet of the Stanford Literary Lab*, December 2013, https://litlab.stanford.edu/LiteraryLabPamphlet6.pdf.

[49] Moretti, "Operationalizing," 113.

[50] Ibid., 119.

What follows is a description of the operationalization of the concept of social prestige in the context not of digital humanities, as was done by Moretti, but of digital reading.

3.3. The literary evaluation model: moving from theory to practice

Social prestige refers to another crucial concept in literary studies -namely, literary evaluation- as it is the result of an evaluative process to which a subject or group submits a cultural object. We found the best definition for the attribution of literary value in the studies of two German scholars: Renate von Heydebrand and Simone Winko. According to von Heydebrand and Winko, the evaluation of a literary text has to take into account both social and individual aspects. The authors elaborated a model that helps to evaluate literature in a pluralistic way, since it includes social functions related to literature and abandons the notion of literary quality as an intrinsic characteristic of the text. The authors argued that the concept of value implies "a complex social act by which a subject attributes value to an object [e.g. a book], in a concrete situation and on the basis of a certain standard of value and certain categorizing assumptions."[51] In other words, von Heydebrand and Winko describe how a combination of numerous individual (micro-level) operations, which may have altogether different aims, results in the (macro-level) phenomenon of canon creation. The micro-level consists of a great diversity of actions, such as an author's choice of literary allusions, a reader's choice of one novel over another, an anthologist's inclusion or exclusion of a writer, a critic's comparison of several contemporary books, a professor's selection of works for a course syllabus, a student's choice of courses, and a journalist's memorial survey of an author. All of these actions involve value judgments regarding literary texts, although the judgments are made by individuals in a variety of roles and groups within the "system of literature." Following the thesis of von Heydebrand and Winko, a literary text is not intrinsically valuable; rather, it only acquires an attributive value in relation to standards of value. For cultivated readers, for example, a "good" book should be "complex" or "rhetorically elaborated" to meet their expectations, while for less sophisticated readers, a "good" book can be a "suspenseful" love story or detective novel. As von Heydebrand and Winko point out, "literary evaluation is by no means limited by

[51] Renate von Heydebrand and Simone Winko, "The Qualities of Literatures: A Concept of Literary Evaluation," in *The Quality of Literature: Studies in Literary Evaluation*, ed. W. van Peer (Amsterdam: John Benjamins, 2008), 223-239 (226).

professional judgment on literary texts," as different groups of readers can employ different standards of value.[52]

The evaluative process might be elicited by aesthetic, educational, and economic factors, since the assessment of literary quality is regulated by norms that are influenced by both the economic sphere and the cultural sphere. While the former aims at maximizing profits according to the law of supply and demand, the latter regulates "the possible gains in terms of knowledge, action orientation, gratification, prestige."[53] Their model focuses on two distinct forms of literary evaluation: explicit verbal utterances and non-linguistic acts of selection (e.g. buying one book instead of another). The standards of value are governed by four dimensions: formal values, content values, relational values, and reception values. While the first three take place on a social level, the fourth takes place on an individual level.

In our operationalization of the concept of social prestige, we focused on reception values, because the aim of our study was to test whether the genre of a literary text (prose vs. poetry) and the reading support through which it is presented (an antique book vs. an e-reader) might influence the attribution of literary quality among contemporary readers. Von Heydebrand and Winko classified reception values in two areas: individual values and social values. The subdimension of individual values looks at the qualitative values of literary texts with regard to personal needs,[54] and it includes the following psychological assets: cognitive value (reflection, memorability), practical value (making sense, significance), and hedonistic value (pleasure, entertainment). The subdimension of social values considers the evaluation of literary texts in terms of economic value, which captures literary works as objects of the economic system, and prestige value, which represents symbolic capital and the boost in prestige among literature in general or within particular texts. We then reviewed the main studies investigating reading experiences in order to build a questionnaire that would fit our needs, and we adopted items from scales like the Poetry Reception Questionnaire,[55] the Experiencing Questionnaire,[56] the

[52] Ibid., 225.

[53] Ibid., 230.

[54] Renate von Heydebrand and Simone Winko, *Einführung in die Wertung von Literatur* (Munich: Schöningh, 1996), 111-131.

[55] Jana Lüdtke, Burkhard Meyer-Sickendieck, and Arthur M. Jacobs, "Immersing in the Stillness of an Early Morning: Testing the Mood Empathy Hypothesis of Poetry Reception," *Psychology of Aesthetics, Creativity, and the Arts* 8, no. 3 (August 2014): 363-377.

[56] Don Kuiken, Paul Campbell, and Paul Sopčák, "The Experiencing Questionnaire: Locating Exceptional Reading Moments," *Scientific Study of Literature* 2, no. 2 (January 2012): 243-272.

Foregrounding Questionnaire,[57] the Reading Experience Questionnaire,[58] and the Transportation Scale[59] to construct the three subscales to measure individual values. Those questionnaires have already been tested and validated in other studies, and items were chosen according to the definitions that von Heydebrand and Winko gave for each subscale. We did not find any models for measuring social values, so we designed our own items to operationalize them:

1) **Cognitive value**: This subscale recognizes the effects that a literary text might have on a reader in terms of the acquisition of knowledge.[60] This value includes cognitive engagement, which takes into account such phenomena as the ease of cognitive access and a strong cognitive focus. When individuals focus their cognitive resources on the narrative world, they experience a loss of time and a loss of self-awareness.[61] In order to operationalize this concept, we selected the following items from the above-mentioned questionnaires:

- "I think the text/poem introduces a new perspective."[62]
- "The text/poem makes me look at things differently."[63]
- "The text/poem makes me stop and think."[64]
- "The subject of the text/poem concerns questions I have often thought about."[65]

2) **Practical value**: This subscale encompasses the scope of everyday actions, life, and ethics. A reader's absorption into a story or transportation into a narrative world may show the effects of the story on their real world beliefs. We operationalized transportation into a narrative world as a distinct mental process, an integrative melding of attention, imagery, and feeling following the Reading Experience Questionnaire and the Transportation Scale. The following items were selected:

[57] Willie van Peer, Jèmeljan Hakemulder, and Sonia Zyngier, "Lines on Feeling: Foregrounding, Aesthetics and Meaning," *Language and Literature: International Journal of Stylistics* 16, no. 2 (May 2007): 197-213.

[58] Markus Appel, Erik Koch, Margrit Schreier, and Norbert Groeben, "Aspekte des Leseerlebens: Skalenentwicklung," *Zeitschrift für Medienpsychologie* 14, no. 4 (2002): 149-154.

[59] Melanie C. Green and Timothy C. Brock, "The Role of Transportation in the Persuasiveness of Public Narratives," *Journal of Personality and Social Psychology* 79, no. 5 (2000): 701-721.

[60] Ibid.

[61] Rick Busselle and Helena Bilandzic, "Measuring Narrative Engagement," *Media Psychology* 12, no. 4 (2009): 321-347.

[62] Van Peer, Hakemulder, and Zyngier, "Lines on Feeling," 213.

[63] Ibid.

[64] Ibid.

[65] Appel et al., "Aspekte des Leseerlebens," 151.

- "I felt that some aspects of the text/poem are important for my everyday life."[66]
- "This text/poem continued to influence my mood after I finished reading it."[67]
- "After reading this text/poem I felt refreshed, renewed, and revitalized."[68]
- "After reading this text/poem it was easy to concentrate again on other things."[69]

3) **Hedonistic value**: This subscale aims to measure the feelings or sensory perceptions triggered by literary language. Readers reflect on their reading experience to appreciate the beauty of a literary text and its emotional or intellectual impact. This subscale helps to explore the emotions that arise from an encounter with literary language. The following items were selected:
   - "While reading the text/poem I noticed the language."[70]
   - "The text/poem is fascinating."[71]
   - "It is a worth reading this text/poem."[72]

4) **Economic value**: This subscale aims to measure the evaluation of the literary text as a product. The material format in which the text is presented plays a particularly important role in this subscale, such as when the text is a precious manuscript, an antique book, or an e-book. Since our focus was on the genre (prose vs. poetry) as well as the reading medium (antique book vs. e-book), we had to create one item that measured the economic value of prose and another that measured the economic value of poetry. Each of these items was presented with an answer scale of 1 (€200) - 5 (€5,000):
   - "A German book publisher paid 5,000 euros for the (printing/digital) rights to a Günter Grass anthology, while another publisher paid 200 euros for the rights to an Oswald Wiener anthology. How much did a German publisher pay for the rights to the anthology that contains the text you have just read?"
   - "A German book publisher paid 5,000 euros for the (printing/digital) rights to an Erich Fried anthology, while another publisher paid 200 euros for the rights to a Friedrich Achleitner anthology. How much did a German publisher pay for the rights to the anthology that contains the poem you have just read?"

[66] Ibid.
[67] Ibid.
[68] Ibid.
[69] Green and Brock, "The Role of Transportation," 704.
[70] Appel et al., "Aspekte des Leseerlebens," 151.
[71] Lüdtke, Meyer-Sickendieck, and Jacobs, "Immersing in the Stillness of an Early Morning," 368.
[72] Ibid.

5) **Prestige value**: This subscale also reflects a text's capital, although in this case we are talking about symbolic rather than economic capital. More specifically, prestige value denotes the gain in prestige or social status that the handling of literature might bring to the actors (readers, editors, publishers, etc.). In a society in which literature is very highly estimated, for example, the act of owning a book and the skill to talk about it competently might confer prestige to the owner.[73] To our knowledge, the prestige value of a literary text has never before been empirically investigated. Since no adequate questionnaire to measure it exists, we created a suitable one based on von Heydebrand and Winko's literary evaluation model. We then worked with Arthur Jacobs and Jana Lüdtke, two neuropsychologists at the Free University of Berlin, to translate this concept into an "operational" questionnaire to be submitted to readers.[74] Each item was presented with a five-point Likert scale ranging from -2 (completely disagree) to +2 (completely agree):

- "Do you think that this text/poem won a literary prize?"
- "Do you think that literary critics rated this text/poem as important?"
- "Do you think that this text/poem should be taught in school?"
- "Do you find this text/poem trivial?"

The resulting questionnaire has already been successfully used in two experiments.[75] Each of our subjects (37 women and 22 men between the ages of 18 and 70) had to read two prose texts (one on paper and one on screen) and two poems (also one on paper and one on screen) before completing the questionnaires we have just described. In each case, the order of the texts (including both the genres and the reading media) was randomized. Reliability analyses were then conducted to evaluate the subscales of the questionnaire, which were used to study the effects of both genre and medium. To do this, a 2x2 repeated measure ANOVA was carried out for each subscale, with genre (prose vs. poetry) and medium (book vs. e-reader) as the two independent variables. The mean values and standard deviations for the subscales from the questionnaire are reported in Table 1.

[73] Von Heydebrand and Winko, *Einführung in die Wertung von Literatur*, 131.

[74] The collaboration started in 2017 and lasted nearly a year. The experiment was funded by the European Cooperation in Science and Technology's Evolution of Reading in the Age of Digitisation (COST E-READ) research initiative, and the University of Verona financed the costs for the participants.

[75] Massimo Salgaro, Pasqualina Sorrentino, Gerhard Lauer, Jana Lüdtke, Arthur M. Jacobs, "How to Measure the Social Prestige of a Nobel Prize in Literature? Development of a Scale Assessing the Literary Value of a Text," *TXT 4* (2018): 134-143.

	independent variables *genre* and *medium*			
	story		poem	
	book	e-reader	book	e-reader
Dependent variables	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*
cognitive value	2.89 (1.04)	2.74 (0.97)	2.59 (0.95)	2.56 (0.94)
practical value	3.10 (0.90)	3.25 (0.91)	3.50 (0.84)	3.51 (0.94)
hedonistic value	3.56 (0.89)	3.22 (1.07)	2.86 (1.03)	2.89 (1.05)
economic value	4.25 (1.52)	3.83 (1.68)	3.80 (1.67)	3.63 (1.54)
prestige value	3.12 (0.77)	3.04 (0.84)	2.63 (0.76)	2.97 (0.79)

Table 1: Mean values and standard deviations for each subscale

The results for cognitive value (story mean=2.81, poem mean=2.57), hedonistic value (story mean=3.39, poem mean=2.88), and prestige value (story mean=3.08, poem mean=2.82) indicated that the subjects rated the stories higher than the poems. On the practical value subscale, the subjects assigned higher values to the poems compared to the stories (story mean=3.17, poem mean=3.51). The economic value subscale revealed a significant effect for the medium alone, as the subjects assigned higher values to all texts presented in a book compared to those presented on an e-reader (F (1, 59.1) =4.6, p=.04; book mean=4.04, e-reader mean=3.72). The prestige value subscale also revealed a significant interaction between genre and medium, as the subjects assigned higher values to stories presented in a book and to poems presented on an e-reader (F (1, 55.8) =4.4, p=.04).

Our experiment showed that economic value and prestige value are the most important indicators related to the literary value of a text in a paperbound or e-book format. The experiment thus explicitly operationalized the category of social prestige introduced by von Heydebrand and Winko. However, the results of these exploratory studies should not be overemphasized. Like other studies, they merely indicate that the print book still has an important position in our society and that e-books are not taking over.[76] The results of the last four years of research on the effects of digitization on reading behaviours conducted by the

[76] Pablo Delgado, Cristina Vargas, Rakefet Ackerman, and Ladislao Salmerón, "Don't Throw Away Your Printed Books: A Meta-Analysis on the Effects of Reading Media on Reading Comprehension," *Educational Research Review* 25 (November 2018): 23-38.

members of the Evolution of Reading in the Age of Digitisation (E-READ) research initiative have similarly shown that print continues to be the preferred reading medium for longer texts, especially when reading for deeper comprehension and memorization. The results of this research are summarized in the Stavanger Declaration Concerning the Future of Reading, which concludes that the transition from print to digital texts is not neutral and that there is reason for caution when introducing digital technologies to education.[77]

Bibliography

Appel, Markus, Erik Koch, Margrit Schreier and Norbert Groeben. 'Aspekte des Leseerlebens: Skalenentwicklung'. *Zeitschrift für Medienpsychologie*, 14 (2002): 149-154.

Bourdieu, Pierre. *The rules of art: Genesis and structure of the literary field*, trans. Susan Emanuel. Stanford: Stanford University Press, 1995.

Busselle, Rick. W., and Helena Bilandzic. 'Measuring narrative engagement'. *Media Psychology*, 12, (2009): 321–347.

Corbetta, Piergiorgio. *Metodologia e tecniche della ricerca sociale*. Bologna: Il Mulino, 2014**.**

Delgado, Pablo, Cristina Vargas, Rakefet Ackerman and Ladislao Salmerón. 'Don't throw away your printed books: A meta-analysis on the effects of reading media on reading comprehension', *Educational Research Review*, 25 (2018): 23-38.

Dictionary of the social sciences, ed. by Craig Calhoun. Oxford University Press, 2002.

Flanders, Julia and Fotis Jannidis. 'Data modeling in a digital humanities context: An introduction'. In: Julia Flanders & Fotis Jannidis (ed), *The shape of data in the digital humanities: Modeling texts and text-based resources*. London, New York, 2019.

[77] "COST E-READ Stavanger Declaration Concerning the Future of Reading," January 2019, https://ereadcost.eu/wp-content/uploads/2019/01/StavangerDeclaration.pdf. See also Massimo Salgaro, "Die Nebeneffekte des Lesens lehren," *Neue Züricher Zeitung*, November 20, 2019, https://www.nzz.ch/meinung/die-nebeneffekte-des-lesens-lehren-ld.1519703.

Green, Melanie C., and Timothy C Brock. 'The role of transportation in the persuasiveness of public narratives'. *Journal of Personality and Social Psychology*, 79(5) (2000): 701–21.

Gruber Garvey, Ellen. 'Ambivalent advertising: Books, prestige, and the circulation of publicity', *A History of the Book in America*. Ed. Carl F. Kaestle and Janice Radway, 5 vols. Chapel Hill: University of North Carolina Press, 4 (2009): 170-189.

Gudinavičius, Arūnas. and Andrius Šuminas. 'Choosing a book by its cover: analysis of a reader's choice', *Journal of Documentation*, Vol. 74 No. 2, (2018): 430-446.

Heydebrand, Renate von and Simone Winko, 'The qualities of literatures: A concept of literary evaluation'. In: Willie van Peer (ed.), *The Quality of Literature: Studies in Literary Evaluation* (Amsterdam & Philadelphia: John Benjamins Publishing Company, 2008): 223-239.

Heydebrand, Renate von and Simone Winko, *Einführung in die Wertung von Literatur: Systematik - Geschichte - Legitimation* (Paderborn: Schöningh, 1996).

Kuiken, Don, Paul Campbell and Paul Sopčák, 'The experiencing questionnaire: Locating exceptional reading moments', *Scientific Study of Literature*, 2 (2012): 243–272.

Lüdtke, Jana, Burkhard Meyer-Sickendieck and Arthur M. Jacobs. 'Immersing in the stillness of an early morning: Testing the mood empathy hypothesis of poetry reception', *Psychology of Aesthetics, Creativity, and the Arts*, 8 (2014): 363-377.

Moretti, Franco. 'Operationalizing': or, the function of measurement in modern literary theory', *New Left Review* 84 (Nov/Dec 2013): 103-119. http://litlab.stanford.edu/LiteraryLabPamphlet6.pdf.

Salgaro, Massimo, Pasqualina Sorrentino, Jana Lüdtke, Arthur Jacobs and Gerhard Lauer. 'How to measure the social prestige of a Nobel Prize in Literature', *TXT*, Amsterdam University Press, (2018): 138-148.

Sorrentino, Pasqualina, Massimo Salgaro, Jana Lüdtke, Arthur Jacobs and Gerhard Lauer. 'Does Age Determine Whether We Read E-Books?', *The Materiality of Reading*. Ed. by Theresa Schilhab & Sue Walker. Aarhus (2020): 47-63.

Van der Weel, Adriaan. *Changing our textual minds: Towards a digital order of knowledge,* Manchester, Manchester University Press, 2011.

Van Peer, Willie, Jèmeljan Hakemulder and Sonia Zyngier. 'Lines on feeling: foregrounding, aesthetics and meaning', *Language and Literature*, 16 (2007): 197-213.

Sitography

http://ereadcost.eu/, accessed 29/03/2019.

http://ereadcost.eu/stavanger-declaration/, accessed 29/03/2019.

4. The mystery of digital natives' existence. Questioning the validity of Prenskian metaphor

Pasqualina Sorrentino, M.A.

Mario Ruoppolo: I felt seasick, in fact.
Pablo Neruda: Because...
Mario Ruoppolo: I can't explain it. I felt like...like a boat tossing around on those words.
Pablo Neruda: Like a boat tossing around on my words? Do you know what you've done, Mario?
Mario Ruoppolo: No, what?
Pablo Neruda: You've invented a metaphor. Yes, you have!
Mario Ruoppolo: Really? But it doesn't count because I didn't mean to.
Pablo Neruda: Meaning to is not important. Images arise spontaneously

The Postman, 1997

Abstract

Net Generation (Tapscott, 1998, 2009; Oblinger & Oblinger, 2005), Generation Y (Zhao and Liu, 2008; Halse and Mallinson, 2009), Millennials (Howe & Strauss, 2000), Homo Zappiens (Veen, 2003) and i-Generation (Rosen, 2010). The labels used to describe the generation of young people and their relation with technology are numerous. Over the past few years, one of the notions, which might have had more echoes among parents, teachers, and policy-makers is those of "digital natives" introduced in 2001 by Mark Prensky. The metaphor has had enduring influence on how the educational system perceives students and technology. Most scholars do not like it, for various reasons. Among other problems, the term implies that technological abilities are innate rather than taught and learned. The aim of this contribution is not to join the existing debate about the existence of digital native but to examine if there is any empirical evidence to support the use of that metaphor in the first place, questioning its usefulness to depict particular generations of young people.

4.1. Introduction

The rapid and constant development of digital technologies and systems in our everyday lives is transforming the way of consuming these technologies within older and younger generations. In *Growing Up Digital: The Rise of the Net Generation*, Tapscott (1998) describes the way digital-generational revolution is transforming society and early introduces the concept of a Net generation. This is supposed to be a new, tech-savvy generation, which thinks differently, has strong self-esteem, and has a personality that is characterised by curiosity, self-reliance, and assertiveness, and is accepting of diversity (Tapscott, 1998, pp. 85-87). He writes:

> This wave of youth coincides with the digital revolution which is transforming all facets of our society. Together these two factors are producing a generation which is not just a demographic bulge but a wave of social transformation […] And at this moment, tens of millions of N-Geners around the world are taking over the steering wheel. This distinction is at the heart of the new generation. For the first time ever, children are taking control of critical elements of a communications revolution. (Tapscott, 1998, pp. 22-26)

In 2001, the author Mark Prensky warned about an apocalyptic generational schism:

> Today's students have not just changed *incrementally* from those of the past, nor simply changed their slang, clothes, body adornments, or styles, as has happened between generations previously. A really big *discontinuity* has taken place. One might even call it a "singularity" – an event which changes things so fundamentally that there is absolutely no going back. This so-called "singularity" is the arrival and rapid dissemination of digital technology in the last decades of the 20th century. (Prensky, 2001, p. 1, emphasis in original).

Prensky coined the metaphors "digital natives" and "digital immigrants" to encapsulate many people's attitudes to new technologies. According to the author, to the "digital natives" generation belong people who grew up in the digital age and who "are all native speakers of the digital language of computers, video games and the Internet" (Prensky, 2001, p. 1), while the "digital immigrants" are represented by those who started to use the language of new technologies at a later stage in life and "like all immigrants, some [learn] better than others – to

adapt to their environment, they always retain, to some degree, their "accent," that is, their foot in the past" (Prensky, 2001, p. 2).

According to Prensky, compared to previous generations, digital natives have the following characteristics:

- are better at multitasking and parallel processing;
- learn interactively;
- prefer random access to information, using hypertext;
- rebuff "serious work" and prefer computer games;
- prefer graphics *before* text;
- need to be networked (Prensky, 2001, p. 3).

Prensky's digital natives and digital immigrants' dichotomy is not the only definition enhancing the old "generation gap" cliché. The debate about digital natives is heated (Bennet *et al.*, 2008). Scholars do not agree on the labels employed to identify this new generation and neither on their exact age range. In the last few decades, a growing number of competing terms claim to identify the present generation of students who have been brought up in a digitally rich environment. The most common labels in circulation are: Net Generation (Tapscott, 1998, 2009; Oblinger & Oblinger, 2005), Generation Y (Zhao and Liu, 2008; Halse and Mallinson, 2009), Millennials (Howe & Strauss, 2000) and Generation C (Duncan-Howell and Lee, 2007). The same generation of young people are sometimes labeled as the IM Generation referring to the Instant Message Generation (Lenhart *et al.*, 2001), the Gamer Generation (Carstens and Beck, 2005) in relation to video games, and even Homo Zappiens (Veen, 2003) for their capacity to control information streams. Numerous newer terms such as the Google Generation (Rowlands *et al.* 2008) or the i-Generation (Rosen, 2010) are used to describe a further generational change, linked to the technological evolution. In his book *Grown up digital: How the Net generation is changing your world* (2009), Tapscott divides people into four-generation groups depending on their birth year. First, there are the Baby Boomers, those born between 1946 and 1964. As technology users Baby Boomers are people that grew up with televisions and therefore are the early generation of modern technology users. The next generation is the Generation X or Baby Bust which covers people born from the early to mid-60s through to the start of the 1980s. Their generation has similarities with the Generation Y concerning computer and Internet skills. The third generation is the Generation Y, also known as the Net Generation or the Millennials, who were born from the early 80s through to the turn of the Millennium. This group grew up fully surrounded by technology, digital media and services that were

available for the majority of people. (Tapscott, 2009) The latest generation starts from 1998 and it is still ongoing, it is called Generation Next or Generation Z (Tapscott, 2009). This generation has no memory of a world without smart devices and broadband internet.

Each definition mentioned above is marginally different and differs in the way it is used by scholars, but in general, the terms are used interchangeably. All these labels given to people born since 1980, as highlighted by Palfrey and Gasser in their book, *Born Digital* (2008) make one thing very clear: the current generation of young people is born in a digital world in which they are seen as more at home than their parents, educators and future employers. For the first time in history, young people are assumed to be more competent than adults in managing and living with new technologies that have become integral to everyday life (Tapscott, 1998). However, can someone be automatically gifted with an innate understanding of technology? Is there any empirical evidence supporting the assumption that the younger generation is more tech-savvy or good at multi-tasking than older generations? Consequently, is the metaphor digital natives/immigrants useful?

Since its introduction, the digital native/digital immigrant metaphor has become the defining metaphor among teachers for the role of technology in education. It marked out a powerful new way of thinking about generational differences that were creating an impasse in debates about media literacy education. (Bennet *et al*., 2008)

Terry Judd (2018) carried out a study trying to assess general and academic interest in and use of the terms digital natives, net generation and millennials over time. The period of interest spanned the years 1998 to September 2017. The data were collected primarily from Google Trends (https://trends.google.com/trends/), Google's main search tool (https://google.com), the Google Scholar academic search tool (https://scholar.google.com) and included some content analysis of academic resources discovered through Google Scholar. According to the author, although references to digital natives and the related terms net generation and millennials in educational technology journals has declined somewhat, public and general academic search concern in these labels – and presumably the ideas related to them – continues to grow. This study might be a valuable illustration of how metaphors might enduring be influent in our society. They are tools, which link with the person's existing thoughts, emotions, and beliefs that are internalized, they create a picture of what the person is already thinking, feeling, and believing.

Metaphoric language is important in communication and cognition because it might help to clear, reflect and boost different ways of making sense of particular aspects of our lives. This central function of metaphor is itself often defined as "framing" (Lakoff, 2001; Semino, 2008;

Ritchie, 2013). The goal of this contribution is to unpack digital natives/digital immigrants' metaphor from its frame in order to observe its intrinsic power in clarify or masking some aspect of the "digital divide" debate. Furthermore, we want to investigate the validity of that metaphor looking at the empirical evidence of this popular dichotomy and its implication for digital literacy and learning.

4.2. Discussion

4.2.1. Digital generation gap and "moral panic": implications for education

In their book *Born Digital* (2008), Palfrey and Gasser devote a chapter to the learners and learning styles and argue that "the educational establishment is utterly confused about what to do about the impact of technology on learning." (Palfrey and Gasser, 2008, p. 238).

The proponents of the digital generation gap claim that not only do the younger people have sophisticated ICT (information and communication technology) skills, but also that through the exposure to these technologies, their "brains have physically changed" and they have developed new cognitive capacities, learning styles and way of thinking (Prensky, 2001, p.1). The new learning behaviors are said to include "fluency in multiple media, valuing each for the types of communication, activities, experiences, and expressions it empowers; learning based on collectively seeking, sieving, and synthesizing experiences rather than individually locating and absorbing information from a single best source; active learning based on experience that includes frequent opportunities for reflection; expression through non-linear associational webs of representations rather than linear stories; and co-design of learning experiences personalized to individual needs and preferences" (Dede, 2005a, p. 10).

According to some commentators, the generational shift caused by a process of technological change brought an urgent and necessary change in education. "Technology has changed the Net Generation, just as it is now changing higher education" (Oblinger & Oblinger, 2005, p. 27) and the learning system should adapt to these "more technology-driven, spontaneous, and multi-sensory" youngsters (Prensky, 2001a, b; McCrindle, 2006).

Teachers are demanded to modify their methods to the "neomillenial" learning style (Dede 2005a, 2005b) and required to adapt to a new technology based educational trend to fit the needs of their technologically experienced students. (Prensky, 2001; Oblinger 2003; Long, 2005; Barnes *et al.*, 2007; Thompson, 2007). Bennet *et al*. label the educator's pedagogical response to Prensky's model as a kind of "academic moral panic" (2008, p. 782), an instinctive

reaction to the awareness that a kind of revolution is taking place or has taken place already and they are urged to adapt to it. Authors borrow from Stanley Cohen (1972) the notion of "moral panic" in order to describe an issue of public concern. Moral panic occurs when people become alarmed in response to a problem perceived as menacing societal values and norms. According to Bennett and colleagues, the popular debate around digital natives/immigrants promotes such panic:

> Arguments are often couched in dramatic language, proclaim a profound change in the world and pronounce stark generational differences. These characteristics are exemplified in the […] quote from Prensky (2001a), but are also evident throughout much of the digital natives' literature. (Bennet *et al*., 2008, p.782)

Even if many proponents seem to take for granted the technological savviness of this generation of students, other researchers have started to question this idea of expertise based on date of birth, because "there is enough evidence that real life is a bit more complicated than Prensky proposes" (Helsper, 2008, p. 3). According to Herring (2008), images of young people, new media, and their experiences are depicted through an adult lens, which may not mirror the reality of the situation. The main arguments against the existence of a digital divide are:

- The notion is discriminating, superficial since it does not take into account the severe inequalities that might exist within the generations (e.g. Facer and Furlong, 2001; Brown and Czerniewicz, 2010).
- There is enough evidence that young people are not completely confident with ICTs as postulated (Hope Cheong, 2008).

Starting from investigating the mental images created by his metaphors, the following sections will look for the empirical evidence of Prensky's dichotomy and will question the validity of the digital native /digital immigrant divide.

4.2.2. Digital natives: a deterministic metaphor

The definition of the digital native is beyond a doubt a catchy phrase, which has been borrowed by many researchers and educators working with young people. It is a simplistic metaphor and intuitively mirrors the stereotypes many have about young generation.

However, the binary opposition digital natives/digital immigrants is quite problematic, since it develops an "othering concept" (Brown and Czerniewicz, 2010), a radical polarisation between the two categories based on the influence of age on the ability to use ICTs. The concept seems to be unflexible, because it implies that a member belonging to one category cannot own skills, characteristics of the other category. As argued by Prensky "those of us who were not born into the digital world but have, at some later point in our lives, become fascinated by and adopted many or most aspects of the new technology are, and always will be compared to them, digital immigrants" (Prensky, 2001, p.1-2). Digital immigrants are designated as refugees– incapable of staying where they were, hardly accepted where they must go, unaware for the new country, and nostalgically attached to their origins: "not-so-smart (or not-so-flexible) immigrants spend most of their time grousing about how good things were in the "old country" (Prensky, 2001, p. 3).

Looking at the present political landscape, Bayne and Ross criticize the colonialist nuance of the digital natives/immigrants metaphor stating that it "inevitably evokes complexities and anxieties around migration, integration, and racial and cultural difference in Western society" (Bayne and Ross, 2007). Furthermore, according to the authors the Prenskian dichotomy sets inevitably the natives in a hierarchical position compared to the immigrant since they mirror the progress, the future against what is past and the obsolete. It is a deterministic concept since it implies that people are born into something that determines them and which they cannot change (Brown and Czerniewicz, 2010).

In 2009, Prensky answers to the critics abandoning the digital native metaphor and creating a new one: the "homo sapiens digital". The author argues that digital enhancement makes humans both smarter and wiser. "Digital wisdom" is a consequence of a natural selection, it has evolutionary connotation and reinforces like the previous metaphor the divide between those who are digitally evolved and those who are not.

As reported in the following section, many researchers have challenged Prensky's model debating its parameters. We review the main studies and debate on the topic in order to see if the metaphor of digital native is empirically supported and if it is useful nowadays.

4.2.3. The digital natives/immigrants' debate: is the "moral panic" empirically based or is it just fighting windmills?

The digital native metaphor has come under hard scrutiny. As mentioned previously, the main critique is related to the lack of empirical evidence supporting Prensky's (2001) claims on the

division of generations (Bennett *et al*., 2008; Hargittai, 2010; Helsper and Eynon, 2010; Lippincott, 2012; Margaryan *et al.*, 2011; Selwyn, 2009; Thinyane, 2010).

An emerging body of research is beginning to reveal some of the complexity of young generation computer use and skills. In a study with over 2,500 undergraduate Australian learners, Kennedy et al. (2007) reported a great disparity between the proposed and actual technology use of the Net Generation, particularly in the area of Web 2.0. Similarly, Margaryan (2008) reported that current university students use a limited range of technologies for learning and socialization. She argues:

> For learning, mainly established ICTs are used – institutional VLEs [Virtual Learning Environment], Google and Wikipedia, and mobile phones…the findings point to a low level of use of and familiarity with collaborative knowledge creation tools, virtual worlds, personal web publishing, and other emergent social technologies (p. 1).

Helsper and Eynon's study of British population demonstrates that "breadth of use, experience, self-efficacy and education are just as, if not more, important than age in explaining how people become digital natives" (Helsper and Eynon, 2010, p. 504). Furthermore, they claim that

> what is very clear is that it is not helpful to define digital natives and immigrants as two distinct, dichotomous generations. While there were differences in how generations engaged with the internet there were similarities across generations as well mainly based on how much experience people have with using technologies. (Helsper and Eynon, 2010, p. 515)

Similarly, the recent study conducted by Sorrentino *et al.* (2020) in Germany on literary reading performance and appreciation on screen vs. on paper rejects popular generational stereotypes according to which young is equivalent to digital or technological adept. Their findings show that not age, but preference and familiarity with the digital medium were the discriminating factors in their results and technology use lies along a continuum of engagement instead of being a dichotomous divide between natives and immigrants.

On the same line, Kirschner and De Bruyckere (2017) review a growing number of international studies that show how students born after 1984 "do not have any deeper knowledge of technology. The knowledge they have is often limited and consists of having basic office suite skills, emailing, text messaging, Facebooking and surfing the Internet" (Kirschner and De Bruyckere, 2017, p. 136). It appears that the technology they use for learning and socialization

is also not very expansive and they do not necessarily recognize the advanced functionality of the applications they adopt. When using technology for learning, the digital natives seem to be passive consumers of information rather than creators of content specifically for academic purposes. In addition, authors reject the popular image of the digital native which has them carrying out multiple tasks in parallel, since the human brain can only execute activities in parallel, if one or more of the activities is sufficiently well-practised to be automatized. When people carry out multiple tasks requiring information processing, they are actually switching between these tasks rather than processing them simultaneously. According to the authors, this kind of switching is "deleterious" for learning, because it impairs performance. On the other hand, some critical researchers note that representatives of a single generation do have some consistent characteristics, which are not represented in other generations (Lippincott, 2012).

Further studies evidence that socio-economic factors might be more significant than age in the digital domain. Brown and Czerniewicz (2010) carried out research with South African university students that underlines the importance of having access to and experience with using information and communications technologies (ICTs), rather than generational factors (Brown and Czerniewicz, 2010, p. 357). According to the authors, the digital native characteristics are those of a "digital elite" contributing to the digital gap (p. 357). Furthermore, Hargittai's (2010) findings suggest that socioeconomic status, including race and gender, is a significant factor and an important predictor of technology skills, abilities and habits (p. 92).

4.3. Conclusion

In the last decade, the claim of the existence of a peculiar new generation of learners in possession of advanced technology abilities which the educational system is not able to support has spread anxiety and "moral panic" among parents, teachers, and policy-makers. A growing body of recent studies have questioned the validity of the digital native metaphor showing that Prensky's assumptions lack empirical evidence and that they are supported mostly by anecdotes and appeals to common sense beliefs.

Metaphors have long provided a fertile ground for researchers in a variety of disciplines including philosophy, literature, linguistics, media studies and cognitive science. They surround our daily life. More than a simply matter of words, they represent a cognitive tool (Landau, 2013). Observation on metaphor's cognitive significance date back to Aristotle. People use metaphors constantly to import the physical and experiential into their understanding of pure and abstract social concepts. Metaphoric language is a powerful tool, which enables charming

the audience and it represents one of the best ornaments to cover poverty of speech, as their lavish use in political debate nowadays show.

Going back to the digital native concept, it can be taken as a good example of what kind of resonance a metaphor can have in our society. The terminology is widely used in public, educational and political debate (Helsper and Enyon, 2010).

The engagement of young people with technology turns out to be more complex and articulated than how it was described by Prensky. The divide between digital natives and immigrants seems to be not fixed, nor is the gulf so broad that it cannot be bridged. According to the studies reviewed in this contribution, younger generations are not actively and extensively making use of new technologies such as Wikis, Blogs and 3D Virtual Worlds for creating content. Many researchers argue nuanced understanding of digital learners rather than a monolithic grouping of characteristics, since their main findings reported that not only age, but experience, breadth of use, gender, social status determine people ICT's skills.

Due to the lack of empirical evidence, the digital natives' metaphor appears to be misleading and conceptually confusing. Recently, scholars tried to reframe and rework on the notion of digital natives by introducing new categories. For example, in their study of Australian university students, Kennedy *et al.* (2010) claim that we might see beyond the digital native/immigrant divide by understanding "four distinct types of technology users: *power* users (14% of sample), *ordinary* users (27%), *irregular* users (14%) and *basic* users (45%)" (emphasis in original, p. 332). Stoerger (2009) proposed a new metaphor, "the digital melting pot" referring to people speaking with "different technology tongues". He suggests that "instead of segregating individuals based on their skills or lack thereof, the digital melting pot is a place where all individuals, including those with low levels of competency, experience technology in a way that fosters opportunities without barriers" (p. 5). White and Le Cornu (2011) introduced the typology "visitors and residents" to map individuals' engagement with the Web. According to the authors, the metaphors of "place" and "tool" most appropriately represent the use of technology in contemporary society, especially given the advent of social media. The visitors' and residents' categorization accounts for people behaving in different ways when using technology, depending on their motivation and context, without categorising them according to age or background. Visitors use the Web as a tool to address specific needs, they log on to the virtual environment, perform a specific task or acquire specific information and then log off. For that reason, they are described as "users, not members, of the Web" placing little value in belonging online. On the other hand, residents spend a proportion of their life online, to connect to, or to be with, other people.

These studies present diverse possible alternatives to digital native discourse and such possibilities might help to improve our understanding of the nature and extent of technology uptake by young people and its implication in education.

References

Bayne, S. & Ross, J. (2007). The 'digital native' and 'digital immigrant': A dangerous opposition. *Proceedings of the Annual Conference of the Society for Research into Higher Education (SRHE)*. Retrieved from http://www.malts.ed.ac.uk/staff/sian/natives_final.pdf

Bennett, S. & Maton, K. (2010). Beyond 'digital natives' debate: Towards a more nuanced understanding of students' technology experiences. *Journal of Computer Assisted Learning*, 26(5), 321-331.

Bennett, S., Maton, K., & Kervin, L. (2008). The 'digital natives' debate: A critical review of the evidence. *British Journal of Educational Technology*, 39, 775–786.

Brown, C. & Czerniewicz, L. (2010). Debunking the 'digital native': beyond digital apartheid, towards digital democracy. *Journal of Computer Assisted Learning*, 26(5), 357-369.

Carstens, A. & Beck, J. (2005). Get Ready for the Gamer generation. *TechTrends,* 49(3), 22-25.

Dede, C. (2005a). Planning for neomillennial learning styles. *EDUCAUSE Quarterly*, 28(1), 7–12.

Dede, C. (2005b). Planning for neomillennial learning styles: implications for investments in technology and faculty. In: D.G. Oblinger and J.L. Oblinger (editors). *Educating the net generation*, at https://digitalcommons.brockport.edu/cgi/viewcontent.cgi?article=1278&context=bookshelf, 15.1–15.22, accessed 18 September 2018.

Duncan-Howell, J. A. & Lee, K. T. (2007). M-Learning – Innovations and initiatives: Finding a place for mobile technologies within tertiary educational settings. In: Atkinson, R.,

McBeath, C., Alan Soong, S. K., & Cheers, C. (Eds.) *Ascilite 2007*, at https://eprints.qut.edu.au/12323/, accessed 18 September 2018.

Facer, K. & Furlong, R. (2001). Beyond the myth of the 'Cyberkid': Young people at the margins of the information revolution. *Journal of Youth Studies*, 4(4), 451-469.

Halse, M. L. & Mallinson, B. J. (2009). Investigating popular Internet applications as supporting e-learning technologies for teaching and learning with Generation Y. *International Journal of Education and Development using ICT*, 5(5), 58-71.

Hargittai, E. (2010). Digital na(t)ives? Variation in internet skills and uses among members of the 'Net Generation'. *Sociological Inquiry*, 80(1), 92-113.

Helsper, E. J. & Enyon, R. (2010). Digital natives: Where is the evidence? *British Educational Research Journal*, 36, 503-520.

Herring, S. C. (2008). Questioning the generational divide: Technological exoticism and adult construction of online youth identity. In: Buckingham, D. (editor). *Youth, identity, and digital media*. Cambridge, Mass.: MIT Press, 71–92.

Hope Cheong, P. (2008). The young and techless? Internet use and problem-solving behaviours among young adults in Singapore. *New Media and Society*, 10 (5), 771-791.

Howe, N. & Strauss, W. (2003). *Millennials go to college: Strategies for a new generation on campus.* Washington, D.C.: American Association of Collegiate Registrars and Admissions Officers.

Judd, T. (2018). The rise and fall (?) of the digital natives. *Australasian Journal of Educational Technology*, 34(5), 99-119.

Kennedy, G., Dalgarno, B, Gray, K., Judd, T., Waycott, J., Bennett, S., Maton, K., Krause, K.L., Bishop, A., Chang, R., & Churchward, A. (2007). The net generation are not big users of Web 2.0 technologies: Preliminary findings from a large cross-institutional study. In: *Proceedings of the annual conference of the Australasian society for computers in learning in*

tertiary education (ASCILITE) Singapore 2007, eds. R. J. Atkinson, C. Mcbeath, S. K. A. Soong, C. Cheers (Singapore: Centre for educational development, Nanyang Technological University Press), 517– 525.

Kennedy, G., Judd, T., Dalgarno, B., & Waycott, J. (2010). Beyond natives and immigrants: exploring types of net generation students. *Journal of Computer Assisted Learning*, 26(5), 332-343.

Kirschner, P. A. & De Bruyckere, P. (2017). The myths of the digital native and the multitasker. *Teaching and Teacher Education* (67), 135-142.

Lakoff, G. (2001). Metaphorik.de, 11 September 2001, available at http://www.metaphorik.de/de/aufsaetze/september-11-2001-und.html, accessed 18 July 2018.

Landau, M. J. (2013). *The Power of metaphor: Examining its influence on social life.* Washington, DC: American Psychological Association.

Lenhart, A., Lee, R. & Lewis, O. (2001). *Teenage life online: The rise of instant-message generation and the internet's impact on friendship and family relationships*. Washington, DC: Pew Internet and American Life Project.

Lippincott, J. K. (2012). Information commons: Meeting millennials' needs. *Journal of Library Administration*, 52(6-7), 538-548.

Margaryan, A. (2008). *Work-based learning: a blend of pedagogy and technology*. Saarbrücken, AV Akademikerverlag.

Margaryan, A., Littlejohn, A., & Vojt, G. (2011). Are digital natives a myth or reality? University students' use of digital technologies. *Computers & Education*, 56(2), 429-440.

Oblinger, D. G. (2003). Boomers, gen-xers and millennials: Understanding the new students. *Educause Review*, 38(4), 37-47.

Oblinger, D. G. & Oblinger, J. L. (2005). Is it age or IT: First steps toward understanding the net generation. In: D.G. and J.L. Oblinger (editors). *Educating the net generation*. 2.1–2.20.

Palfrey, J. & Gasser, U. (2008). *Born digital: Understanding the first generation of digital natives*. New York: Basic Books.

Prensky, M. (2001a). Digital natives, digital immigrants. *On the Horizon*, 9(5), 1-6.

Prensky, M. (2001b). Digital natives, digital immigrants, part 2: Do they really think differently? *On the Horizon*, 9(6), 6.

Prensky, M. (2009). H. sapiens digital: From digital immigrants and digital natives to digital wisdom, *Innovate,* 5(3).

Ritchie, D. L. (2013). *Metaphor*. Cambridge University Press.

Rowlands, I., Nicholas, D., William, P., Huntington, P., Fieldhouse, M., Gunter, B., Withey, R., Jamali, H. R., Dobrowolski, T., & Tenopir, C. (2008). The Google generation: The information behaviour of the researcher of the future. *Aslib Proceedings*, 60(4), 290-310.

Selwyn, N. (2009). The digital native – myth and reality. *Aslib Proceedings*: New Information Perspectives, 61(4), 364-379.

Semino, E. (2008). *Metaphor in discourse*. Cambridge University Press.

Sorrentino, P., Salgaro, M., Lauer, G., Sylvester, T., Lüdtke, J., & Jacobs, A. (2020). Does age determine whether we read e-books? *The Materiality of Reading*. Ed. by T. Schilhab & S. Walker. Aarhus, 47-63.

Stoerger, S. (2009). The digital melting pot: Bridging the digital native-immigrant divide. *First Monday*, 14(7).

Tapscott, D. (1998). *Growing up digital: The rise of the Net generation*. New York: McGraw-Hill.

Tapscott, D. (2009). *Grown up digital: How the Net generation is changing your world*. New York: McGraw-Hill.

Thinyane, H. (2010). Are digital natives a world-wide phenomenon? An investigation into South African first year students' use and experience with technology. *Computers & Education*, 55(1), 406-414.

Veen, W. (2003). A new force for change: homo zappiens. *The Learning Citizen* (7), 5-7.

White, D. S. & Le Cornu, A. (2011). Visitors and residents: A new typology for online engagement. *First Monday*, 16(9).

Zhao, E. & Liu, L. (2008). China's generation Y: Understanding the workforce. Conference paper on 4th IEEE International Conference on Management of Innovation and Technology, Bangkok, 2008, 612-616.

5. Does age determine whether we read e-books? Questioning the dichotomy of digital natives vs. digital immigrants

Pasqualina Sorrentino, Massimo Salgaro, Teresa Sylvester, Jana Lüdtke, Arthur Jacobs & Gerhard Lauer

Abstract[*]

The dichotomy 'digital natives/digital immigrants' was introduced in 2001 by Mark Prensky with the aim of describing the digital divide existing between young people and the elderly. The metaphor has had enduring influence on how the educational system perceives students and technology. Most scholars do not like it, for various reasons. Among other problems, the term implies that technological abilities are innate rather than taught and learned. The purpose of this study is to examine whether there is any empirical evidence to support the use of the metaphor. We looked at the reading preferences and habits of younger and older people in relation to literary reading on paper vs. on screen. We tested subjects (n = 59) of different ages and socio-cultural backgrounds. Our results clearly distinguish between two attitudes towards literary reading on screen, represented by readers who have been using a digital device for longer than three years, and readers who have used one for no longer than two years or who have never handled one.

5.1. Introduction

It is often stated that we are living in an era of a great cultural transformation: the third "reading revolution" (Darnton 1991, 148). After the invention of writing 6,000 years ago and of the Gutenberg printing press in the 15th century, the introduction of digital texts and reading devices such as the Kindle in 2007 has changed our reading minds again (Wolf 2007). Along with the embodiment and diffusion of digital technologies into every part of our society and economy, a whole new generation of young people was born: the so-called digital natives.

Marc Prensky (2001), working in the field of education, introduced the dichotomy of digital natives/digital immigrants in order to describe a generational divide. According to Prensky's classification, the first group are the 'native speakers' of the digital language of computers, the

[*]The article reported in this doctoral thesis includes some changes from its published version.

Internet and video games – the generations who were born into the digital world. The so-called 'digital immigrants', on the other hand, are represented by those who started to use the language of new technologies at a later stage in life, and "like all immigrants, some [learn] better than others – to adapt to their environment, they always retain, to some degree, their 'accent', that is, their foot in the past" (Prensky 2001).

The debate about digital natives is heated (Bennet et al. 2008). Scholars do not agree on the terminology employed to identify this new generation, nor on their exact age range. 'Net Generation' (Tapscott 1997), 'Generation Y', 'Millennials' (Howe & Strauss 2000), 'Digital Natives' (Prensky 2001) and 'iGen' (Twenge 2017) are all competing terms used in the digital natives literature. According to Johnson and Johnson (2010) digital natives are those who were born between 1981 and 1995 (Johnson & Johnson 2010). Smola and Sutton (2002) argue that the digital natives are those born between 1979 and 1994. For Tapscott (2009) the digital natives are those born between 1977 and 1997.

An additional problem when it comes to research on literary reading on screen versus on paper (Dillon 1992; Ziefle 1998; Mayes et al. 2001; Wästlund et al. 2005; Noyes & Garland 2008; Mangen & Kuiken 2014; Mangen, Walgermo & Brønnick 2013) is that the subjects of investigations are usually students – who are, according to Prensky, digital natives. It is therefore questionable whether the results of such studies could be generalized.

5.2. Theoretical background

Before 2007, when Amazon launched the first Kindle, the word 'book' was always associated with something physical – with specific paratextual information (Genette 1997) given by typography, cover, size and colour. Due to the long Christian tradition of book production and the close ties between bourgeois society and printing culture since the 18th and 19th century, in the 20th century the culture of books in the Western world turned into a new cult of books: dictators' publications became the 'sacred' core of state propaganda and a tool for the manipulation of the people (Koschorke 2016).

For historical and biographical reasons, different readers developed various attitudes towards books and screens. Especially for the older generation, the book was something 'sacred'; it had its own 'materiality' and 'originality'. Already the concept of 'original' has been severely compromised by the invention of printing. "Yet the digital media has marginalized the notion of the original even further. […] After all digital copies cannot be distinguished from the original" (van der Weel 2011, 181–182). All digital texts, regardless of provenance or quality,

look identical. Literary reading is a human–technology interaction that involves our bodies and our brains engaging with a device of certain ergonomic and audio-visual affordances. In addition, the book has a user interface (i.e. cover, paper, titles, page numbers) according to van der Weel (2011, 187), but we are so used to it that we do not notice it anymore. Digitalization can implicate haptic changes, such as the way we interact with different media with our hands. When we read on an e-reader, we click and scroll through the pages, while in paper reading we are literally in touch with the text itself (Mangen 2008, 405). In a recent study of iPad apps in kindergarten, Merchant (2015) found that the body and in particular the hands are fundamental when using iPad apps for story-reading with young children. The haptics of the iPad interface makes a crucial difference for meaning-making, for the experience of stories, for navigation through the text and for how the texts are shared overall (Merchant 2015). These haptic differences were also tested in previous experiments. For example, Mangen and Kuiken (2014) wanted to examine the effects of reading medium (iPad vs. booklet) and a paratext manipulation (fiction vs. nonfiction) on aspects of narrative engagement. Their results indicated that subjects using the iPad reported uncertainty about location within text (dislocation) and a poorer grasp of its length. This finding replicates evidence from other studies indicating that readers lose their sense of where they are in the text when reading on screen (Piolat et al. 1997; Wästlund et al. 2005; Mangen et al. 2011; Walgermo & Brønnick 2013). The most interesting main effect was for the measure of medium awkwardness, in that subjects reading non-fiction on the iPad reported feeling that the holding and manipulation of the medium was more awkward during reading than readers in the booklet condition (sample items: “I felt awkward manipulating the booklet/iPad during reading”; “I felt awkward holding the booklet/iPad during reading”).

Starting from Prensky’s dichotomy, the aim of the current study is to investigate whether the categories of digital natives, namely the younger generations born into the digital world, and digital immigrants, those who started to use new technologies at a later point in their life, exist in relation to reading habits associated with literary reading on paper vs. on screen. Furthermore, it explores possible differences between the two groups. We want to see whether there is any empirical evidence to support the use of Prensky’s metaphor of digital natives vs. immigrants in the first place, questioning its usefulness in characterising particular generations of people.

5.3. Methods

Fifty-nine participants (37 women, 22 men) aged between 18 and 70 years old (M age = 40.0, SD age = 18.8) were recruited in the area around Göttingen and Berlin through printed and online advertisements, and social networking websites (i.e. Facebook). Forty-nine participated for free; the remaining ten were volunteers who participated for compensation. All of them were from different backgrounds: there were workers, pensioners, and people with and without academic educations.

The first part of the study enabled all participants to experience the reading of different pieces of literature in paper books and on an electronic device (Kindle reader). All participants read two short stories and two poems, one each in a paper book and on the Kindle reader, in a counterbalanced order. After reading each text, participants filled out some memory tests and rated their agreement with a list of statements regarding their reading experience on a 5-point scale.[78] At the end of the study participants filled out an additional questionnaire. Besides the questions related to their age, gender and educational achievement, they responded to the items presented below concerning their reading habits:

1. How many years have you been reading digitally in your free time?

   Answers on a 5-point scale: 1 (for more than 5 years) – 5 (never)

2. How many books did you read last year in your free time?

   Answers on a 5-point scale: 1 (more than 20) – 5 (none)

The first two questions regarding the subjects' familiarity were used to split the sample into two groups independently of their age and focusing on their digital reading experience. To explore group differences due to familiarity with digital texts further, we also presented an adapted form of the haptic dissonance scale (Gerlach & Buxmann 2011). Participants indicated their agreement with the following statements on a 5-point rating scale (from 1, I strongly disagree, to 5, I strongly agree):

3. For me it makes no difference whether I read a printed book or an e-book.

4. I find reading in digital formats cold.

[78] For more information regarding the items adopted, see Salgaro et al. (2018).

5. An e-book is more technical and reminds me of work.

6. Reading an e-book feels more technically distant and not natural in my hands, thus I cannot establish a close relationship with the book.

7. Paper books for me have a kind of 'fragrance'.

8. I set a high value on the paper quality of printed books.

To test whether both groups corresponded to the assumed Prenskyian dichotomy of digital natives/digital immigrants, we compared the answers of both groups to all other questions about their reading habits and their usage of digital vs. paper texts for leisure reading (described below):

9. Do you prefer to read digital or printed books in your free time?

   Answers on a 5-point scale: 1 (only digital books) – 5 (only printed books)

10. Which medium supports deep reading (better)?

    Answers on a 5-point scale: 1 (only digital) – 5 (only printed)

5.4. Results

As a first step, we used item 1, concerning familiarity with the digital medium, to split the participants into two groups. Thirty-three participants (66.7% female) reported a high familiarity, indicating the usage of digital media for leisure reading for more than three years. The remaining 26 participants (57.7% female) reported low familiarity, indicated by no usage of digital devices (or usage for less than 2 years).

Comparing both groups with respect to age indicated no significant differences: $t(57) = 1.7$, $p = 0.10$. As shown in Figure 1, we could identify young participants below 40 reporting less familiarity (measured in time spent reading digitally in their free time), as well as older participants reporting high familiarity.

This outcome is interesting because it suggests that neither young nor elderly people are homogeneous in terms of their use of technologies for reading. In accordance with other studies (Helsper & Enyon 2008; Herring 2008; Cheong 2008), our findings seem to reject this idea of digital expertise and technological savviness based on date of birth. Furthermore, we did not register any differences between the groups in term of reading frequency, since our subjects reported the same amount of leisure reading in response to item 2 ($\chi^2 = 1.4$, $p = 0.8$).

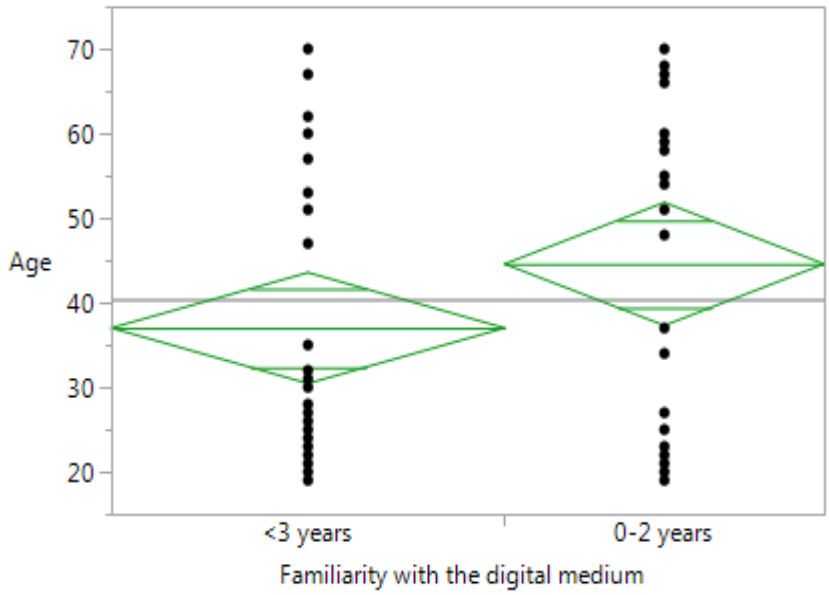


Figure 1 Responses to the statement "How many years have you been reading digitally in your free time?"

Note: Each error bar is constructed using a 95% confidence interval of the mean.

For the remainder of this chapter, we therefore use the labels low vs. high familiarity to refer to both groups.

To explore the two familiarity groups further, we compared whether they see any differences in reading paper books compared to reading e-books (item 3). The high familiarity group agree more strongly with the statement that reading paper books does not differ from reading e-books than the low familiarity group, shown in the t-test: $t(57) = -2.7$, $p = 0.009$.

The results presented in Figures 2–4 show that familiarity with the medium determines whether digital reading was perceived as 'cold', 'distant' and/or associated with work (items 4–6). Compared with the high familiarity group, members of the low familiarity group perceived e-books as 'cold', $t(57) = 4.2$, $p = 0.0001$, as associated with work (t-test: $t(57) = 3.9$, $p<0.001$) and as distant (t-test: $t(57) = 4.5$, $p<0.0001$). Readers from the low familiarity group were not able to establish an emotional, close connection with texts in an e-book format. For literary reading, this is an important gap as it seems emotional bonding with the fictional characters is impeded by the digital medium. Gerlach and Buxmann (2011) described this lack of (warm) haptic feeling as "haptic dissonance".

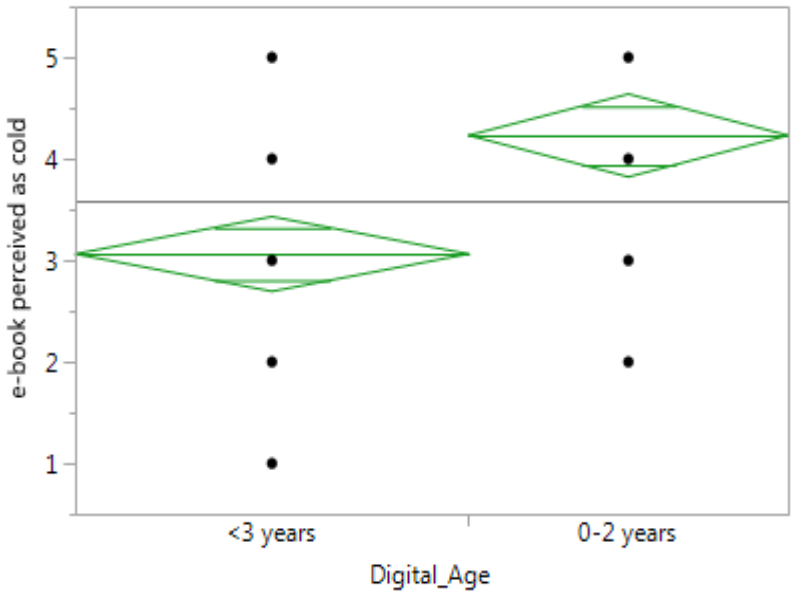


Figure 2 Responses to the statement "I find reading in digital formats cold"

Note: Each error bar is constructed using a 95% confidence interval of the mean.

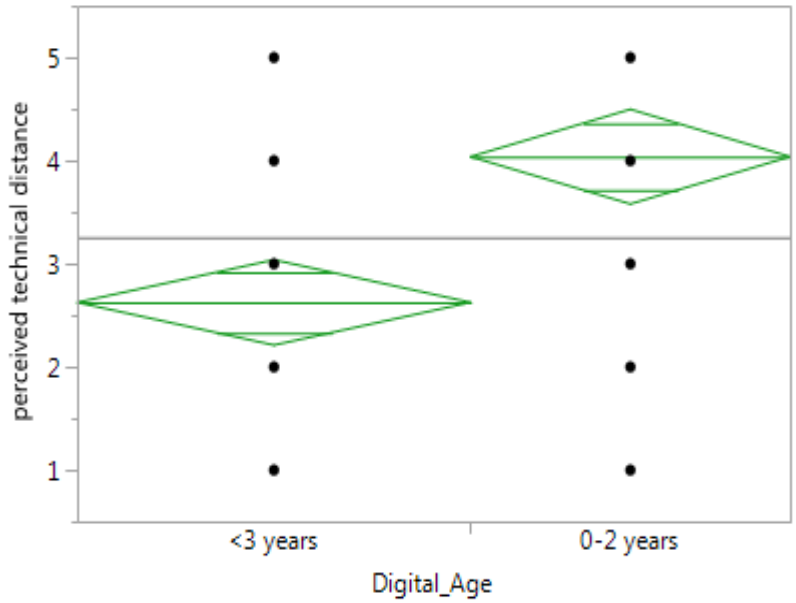


Figure 3 Responses to the statement "Reading an e-book feels more technically distant and not natural in my hands, thus I cannot establish a close relationship with the book"

Note: Each error bar is constructed using a 95% confidence interval of the mean.

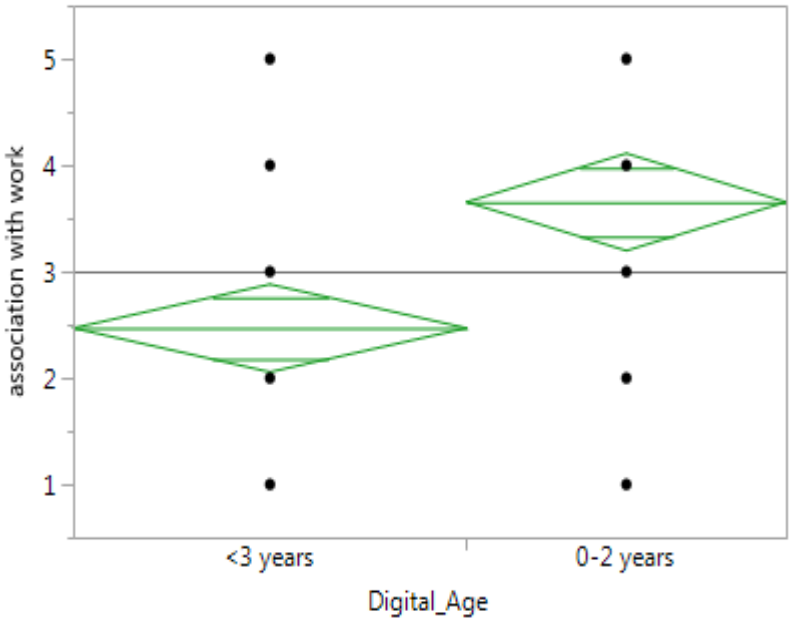


Figure 4 Responses to the statement "An e-book is more technical and reminds me of work"

Note: Each error bar is constructed using a 95% confidence interval of the mean.

Moreover, subjects with a low e-reading familiarity also perceived the e-book as more technically distant and not natural in their hands. It seems that they struggle to establish a close relation with e-books. This is in line with the assumption that texts presented in paper books are often described as tangible, whereas texts presented on screen are described as *intangible* and *detached* or *mediated* (Mangen 2008). Our data show that people who are unfamiliar with digital devices in particular differ in their perceived materiality of text on paper and of text on a screen. It is important to highlight the exact phrasing of the description of these embodied sensations, as digital texts are described as "distant" and "not natural", which refer to precise bodily sensations. Reading on paper seems to be related to a kind of emotional state of mind that leads readers with low digital familiarity to perceive mechanical devices as an obstacle to building a close relation with a book.

Furthermore, the results related to the acceptance of the medium showed that e-reading, far from being a leisure activity, was perceived by the low familiarity group as technical and associated with work. Again, the familiarity with the medium compromises the perception that the subjects have of the reading experience as a moment of relaxation and enjoyment. It seems that subjects naturally distinguish between reading for leisure on paper and reading for work digitally, where literary reading belongs to the first activity.

Additional analysis indicated that the familiarity groups differ especially in their perceptions and evaluations of e-books. As shown in Figure 5, the groups do not differ significantly (both $t<1$) in their evaluations of the materiality of reading paper books (items 7–8). Both groups agreed equally strongly with the statement that paper books have a kind of 'fragrance' and that paper quality is important.

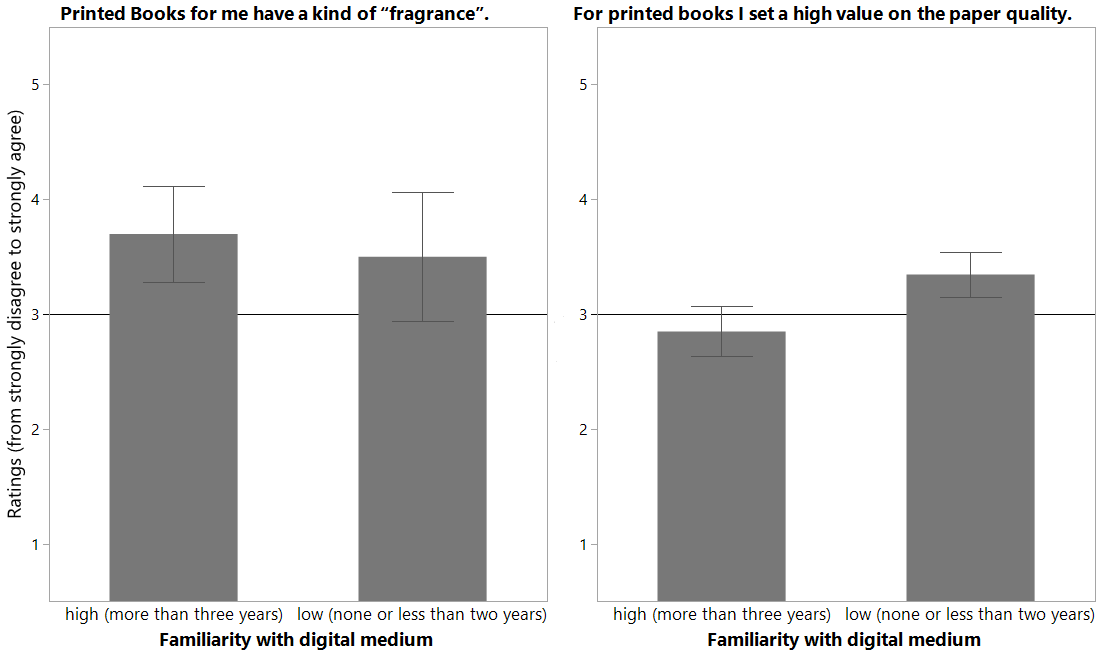


Figure 5 Responses to the statements "Paper books for me have a kind of fragrance" and "I set a high value on paper quality of printed books"

Note: Each error bar is constructed using a 95% confidence interval of the mean.

The findings presented in this study suggest that the dichotomy of digital natives/digital immigrants when related to reading behaviour (paper vs. screen) is misleading. The inconsistency of the Prenskyian dichotomy with respect to literary reading in free time is further revealed by the findings represented in the following graph in respect to the preferred medium for leisure reading. According to our results, not only the low familiarity group, but also the high familiarity one showed a stronger inclination for reading printed books rather than digital ones in their free time (item 9, Figure 6).

The paper book is preferred by subjects in both groups as the medium allowing an active process of thoughtful and deliberate reading, or "deep reading" (Wolf 2009), which supports comprehension including critical analysis, reflection and insight (item 10, Figure 7).

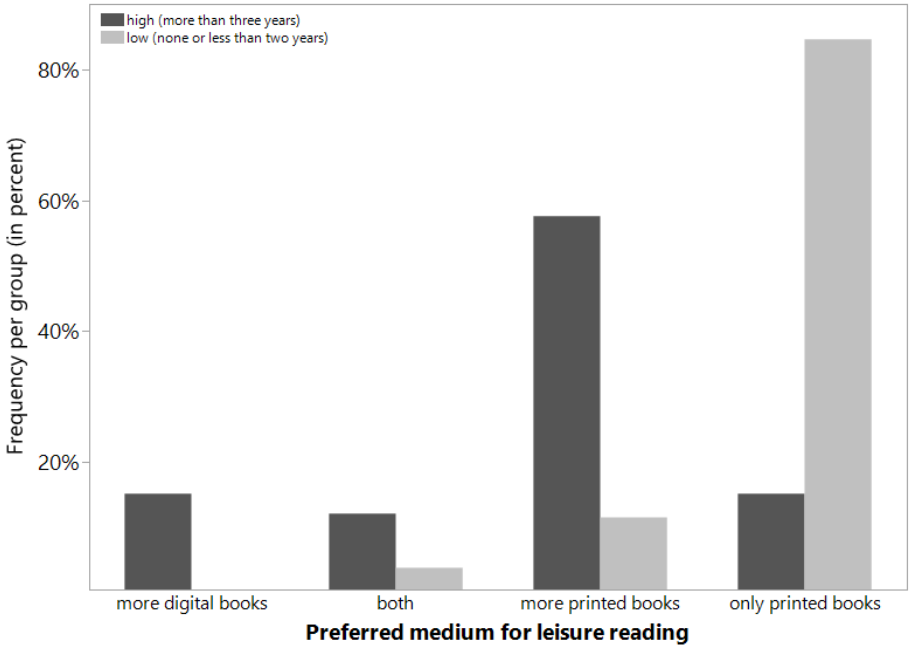


Figure 6 Responses by group to the question "Do you prefer to read digital or printed books in your free time?"

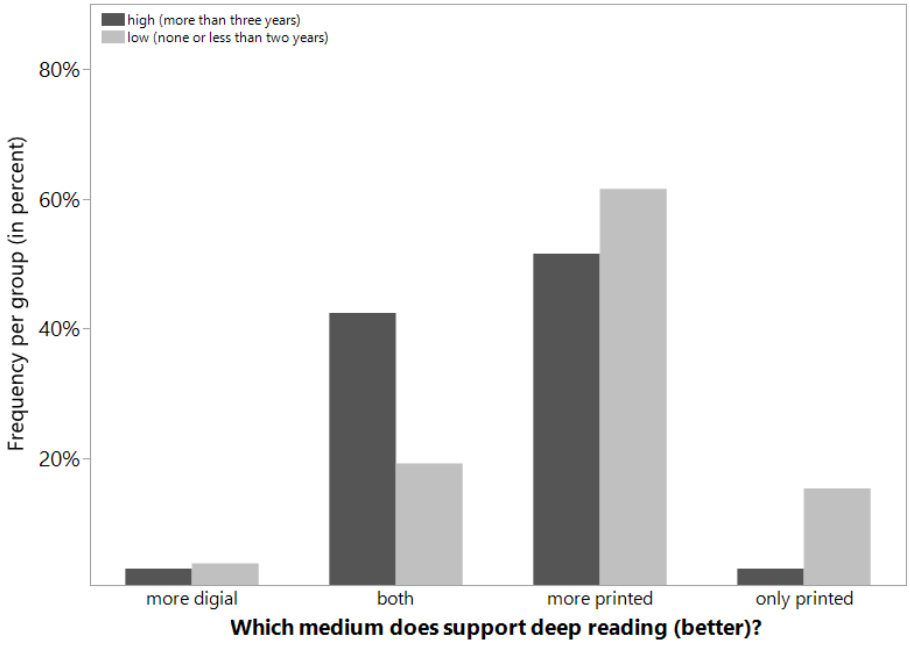


Figure 7 Responses by group to the question "Which medium supports deep reading (better)?"

These results evidence the social prestige associated with the printed book in Western culture, a culture described by Adriaan van der Weel as based on the "Order of the Book" (van der Weel 2011), and shed light on a prejudice against digital media which is not empirically based, since

in our study we did not register any difference in comprehension and memory across reading media.[79]

Overall, our results show that familiarity with a reading medium is crucial in determining the quality of people's reading experience. Haptic dissonance is the result of a mismatch between the familiarity of the reader with the medium and the medium itself.

5.5. Conclusion

Our findings reject popular generational stereotypes according to which young is equivalent to digitally or technologically adept, and the existence of a "digital divide" (Compaine 2001), or a gap between people with effective access to digital technology for leisure reading and those with very limited or no access at all. In line with other studies, our results reinforce the critique of the age-associated notions of "digital natives" and "digital immigrants" (Bennet et al. 2008). At least for our subjects, it was not age, but preference and familiarity with the digital medium that were the discriminating factors. This supports previous findings (Chen et al. 2014; Margolin et al. 2013; Noyes & Garland, 2003) on the correlation between subjects' reading performance on screen vs. on paper and their familiarity with the reading medium.

The value of the physicality of reading – the importance of touch – seems to be a key aspect in explaining the different reading preferences of the two groups. Finally, both the printed book and the e-reader are objects that offer specific affordances and therefore haptic interactions. The study's outcome contributes to the discussion on literary reading on screen vs. on paper. Along the same lines as other similar studies, our results seem to indicate that the paper book still has an important position in our society and that e-books are not taking over.[80]

Unlike some previous studies, however, it allows generalization of the results to various kinds of literary readers, since the interviewed sample included different ages and varied backgrounds. The experiment was focused on personal experience and comprehension but did not distinguish between learning and remembering. A further limitation of this study is the limited number of participants. To make more general statements about the dichotomy of digital immigrants/digital natives a test including more subjects is needed.

[79] See Salgaro et al. (2018) for further results.
[80] See Delgado et al. (2018).

References

Bennett, S., K. Maton & L. Kervin. (2008). The 'digital natives' debate: A critical review of the evidence. *British Journal of Educational Technology*, 39(5), 775–786.

Chen, G., W. Cheng, T.-W. Chang, X. Zheng & R. Huang. (2014). A comparison of reading comprehension across paper, computer screens, and tablets: Does tablet familiarity matter? *Journal of Computers in Education*, 1(2–3), 213–225.

Cheong, P. (2008). The young and techless? Internet use and problem-solving behaviors among young adults in Singapore. *New Media and Society*, 10(5), 771–791.

Combes, B. (2009). Generation Y: Are they really digital natives or more like digital refugees? *Synergy*, 7(1), 31–40.

Compaine, B. M. (2001). *The digital divide: Facing a crisis or creating a myth?* Cambridge, MA: MIT Press.

Darnton, R. (1991). History of reading. In Peter Burke (ed.), *New Perspectives on Historical Writing*, 140–167, Cambridge: Polity.

Delgado, P., C. Vargas, R. Ackerman & L. Salmerón. (2018). Don't throw away your printed books: A meta-analysis on the effects of reading media on reading comprehension. *Educational Research Review*, 25, 23–38.

Dillon, A. (1992). Reading from paper versus screens: A critical review of the empirical literature. *Ergonomics*, 35, 1297–1326.

Genette, G. (1997). *Paratexts: Thresholds of textuality of Interpretation*, Cambridge: Cambridge University Press.

Gerlach, J. & P. Buxmann. (2011). *Investigating the acceptance of electronic books: The impact of haptic dissonance on innovation adoption*. European Conference on Information Systems (ECIS).

Green, M. C. & T. C. Brock. (2000). The role of transportation in the persuasiveness of public narratives. *Journal of Personality and Social Psychology*, 79(5), 701–721.

Helsper, E. J. & R. Enyon. (2010). Digital natives: Where is the evidence? *British Educational Research Journal*, 36, 503–520.

Herring, S. C. (2008). Questioning the generational divide: Technological exoticism and adult construction of online youth identity. In D. Buckingham (ed.), *Youth, Identity, and Digital Media*, Cambridge, MA: MIT Press, 71–92.

Hershatter, A. & M. Epstein. (2017). Millennials and the world of work: An organization and management perspective. *Journal of Business and Psychology*, 25(2), 211–223.

Howe, N. & W. Strauss. (2000). *Millennials rising: The next great generation*, New York: Vintage.

Johnson, M. & L. Johnson. (2010). *Generations, inc.: From boomers to linksters – Managing the friction between generations at work*, New York: AMACOM.

Kirschner, P. A. & P. De Bruyckere. (2017). The myths of the digital native and the multitasker. *Teaching and Teacher Education*, 67, 135–142.

Koschorke, A. (2016). *Adolf Hitlers "Mein Kampf": Zur Poetik des Nationalsozialismus*, Berlin: Matthes und Seitz.

Lüdtke, J., B. Meyer-Sickendieck & A. M. Jacobs. (2014). Immersing in the stillness of an early morning: Testing the mood empathy hypothesis of poetry reception. *Psychology of Aesthetics, Creativity and the Arts*, 8, 363–377.

Mangen, A., & D. Kuiken. (2014). Lost in the iPad: Narrative engagement on paper and tablet. *Scientific Study of Literature*, 4(2), 150–177.

Mangen, A., & A. van der Weel. (2016). The evolution of reading in the age of digitization: An integrative framework for reading research. *Literacy*, 50(3), 116–124.

Mangen, A. (2016). The digitization of literary reading: Contributions from empirical research. *Orbis Litterarum*, 71(3), 240–262.

Mangen, A. (2008). Hypertext fiction reading: Haptics and immersion. *Journal of Research in Reading*, 31, 404–419.

Margolin, S. J., C. Driscoll, M. J. Toland & J. L. Kegler. (2013). E-readers, computer screens, or paper: Does reading comprehension change across media platforms? *Applied Cognitive Psychology*, 27(4), 512–551.

Mayes, D. K., V. K. Sims & J. M. Koonce. (2001). Comprehension and workload differences for VDT and paper-based reading. *International Journal of Industrial Ergonomics*, 28, 367–378.

Merchant, G. (2015). Keep taking the tablets: iPads, story apps and early literacy. *Australian Journal of Language & Literacy*, 38(1), 3–11.

Noyes, J. M. & K. J. Garland. (2008). Computer- vs. paper-based tasks: Are they equivalent? *Ergonomics*, 51(9), 1352–1375.

Noyes, J. M. & K. J. Garland. (2003). VDT versus paper-based text: Reply to Mayes, Sims and Koonce. *International Journal of Industrial Ergonomics*, 31(6), 411–423.

Prensky, M. (2009). Listen to the natives. *Kaleidoscope: Contemporary and Classic Readings in Education*, 306–310.

Prensky, M. (2001). Digital natives, digital immigrants Part 1. *On the horizon*, 9(5), 1–6.

Salgaro, M., P. Sorrentino, G. Lauer, J. Lüdtke & A. M. Jacobs. (2018). How to measure the social prestige of a Nobel Prize in Literature? Development of a scale assessing the literary value of a text. *TXT*, 5, 138–148.

Smola, K. & C. D. Sutton. (2002). Generational differences: Revisiting generational work values for the new millennium. *Journal of Organizational Behavior*, 23(4), 363–382.

Tapscott, D. (2009). *Grown up digital: How the net generation is changing your world*, New York: McGraw-Hill Professional.

Tapscott, D. (1997). *Growing up digital: The rise of the net generation*. New York: McGraw-Hill.

Twenge, J. M. (2017). *iGen. The 10 trends shaping today's young people – and the nation*, New York: Simon and Schuster.

Tyson, S. & E. Parry. (2011). *Managing an age diverse workforce*, Basingstoke: Palgrave Macmillan.

Van der Weel, A. (2011). *Changing our textual minds: Towards a digital order of knowledge*, Manchester: Manchester University Press.

Wästlund, E., H. Reinikka, T. Norlader & T. Archer. (2005). Effects of VDT and paper presentation on consumption and production of information: Psychological and physiological factors. *Computers in Human Behavior*, 21, 377–394.

Wolf, M. & M. Barzillai. (2009). The importance of deep reading. In M. Scherer (ed.), *Challenging the Whole Child: Reflections on Best Practices in Learning, Teaching, and Leadership*, ASCD.

Wolf, M. (2007). *Proust and the squid: The story and science of the reading brain*, New York: HarperCollins.

Zemke, R., C. Raines & B. Filipczak. (2000). *Generations at work: Managing the clash of veterans, boomers, xers, and nexters in your workplace*, New York: AMACOM.

Ziefle, M. (1998). Effects of display resolution on visual performance. *Human Factors*, 40(4), 554–568.

PART II: Digital reading and language learning

6. Foreign language education in the digital age

Language is generally understood as the medium of communication of ideas and thoughts; therefore, language learning is a subject of great interest, attention and investigation. It represents a dynamic and innovating process that is getting richer and enhanced. New technologies and internet present daily new opportunities and tools to help students in the acquisition of a foreign language. Mobile devices such as the iPad or Tablet and software apps make language learning portable. The use language apps, learning platforms, e- books, audio books, videos, audio lingual teaching aids have not only improved the ways of learning, but also make the learning process more efficient and effective. Content management systems (CMS) such as Moodle, Blackboard, Ilias adopted for middle school up to university language courses extend learning time and allow students to plan anywhere and anytime their work flexibly outside of class (e.g., using audio-visual-text materials and taking part in discussion forums). The use of those digital inputs represents a significant contribution for second language learners, since it made it possible to help acquire native- like performance in the target language. For teachers, the digital tools might be a way of making their work more pleasant and captivating.

Linguists, psychologists and language teachers have been working on vocabulary learning strategies for a long period (Levenston, 1979). And especially in recent years a great number of researches have been focused on the use of digital tools for learning and they aimed to compare the retention effects of different vocabulary presentation methods.

The second section of this work will look into the digitalization implications in the context of a foreign language with a particular focus on the dictionary use. The first paper presents an overview of the studies conducted on the topic and the second one reports the results of an experiment comparing the use of paper and online dictionary for vocabulary expansion.

Bibliography

Levenston, E. (1979). Second language acquisition: issues and problems. *Interlanguage Studies Bulletin*, 4(2), 147-160.

6.1. (E-) Reading in a foreign language and dictionary use. Does the medium matter? A literature review

Authors:
Pasqualina Sorrentino, University of Göttingen
Gerhard Lauer, University of Basel

6.1.1. Have e-books lost their shine? Why is digital literary reading not much more popular?

Over time, digital reading has become commonplace in our everyday lives, the norm for numerous activities. We read and answer to personal messages and emails without first printing them, we access newspapers and magazines online. Despite the prevalence of digital text, digital reading for pleasure is still much less popular than traditional reading from text. The 2017 report "The Book Sector in Europe: Facts and Figures"[81] realized by the Federation of European Publishers (FEP) offers a clear overview of the book market of last few years. The report shows that the digital market is estimated to represent some 6-7% of the total market in Europe, with significant differences between countries. The following graph shows the proportion of digital sales in the overall book market in some selected countries comparing the digital (in blue) and print (in red) book market. According to the FEP Report it is however hard to predict how the e-book market will develop in the coming years, as "we have passed several dates at which the demise of paper had been predicted: what is sure is that a lot will depend on the readers' preferences and that different supports, formats and business models are most certainly going to coexist for the foreseeable future."[82]

[81] See https://fep-fee.eu/The-Federation-of-European-844, accessed 08/24/2018.
[82] *Ibidem*, p.5.

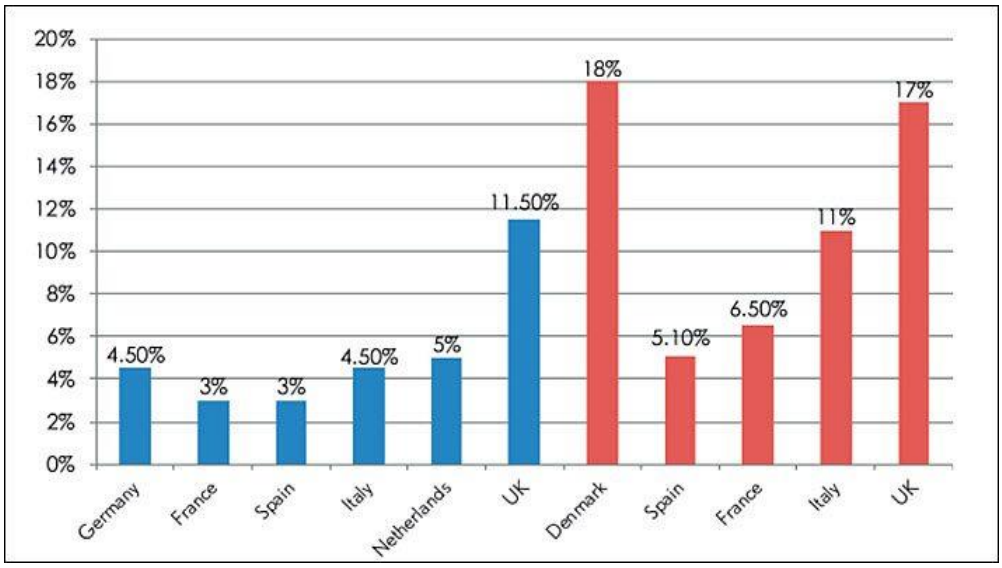


Figure 1– Federation of European Publishers 2017 Report - Note: Germany, France, Italy, Netherlands: the share of e-books refers to the trade/consumer books sector only (excluding scientific and educational books) - Due to differences in methodology, in most cases figures are not comparable between countries.

Last year, Stephen Lotinga, chief executive of the Publishers Association, stated in an article: "there is generally a sense that people are now getting screen tiredness, or fatigue, from so many devices being used, watched or looked at in their week. [Printed] books provide an opportunity to step away from that"[83]. Whether this is more than a statement, needs further examination. However, print still remains the preferred means of reading text in the educational context too and student preference for print is accentuated when reading involves thorough study (Ackerman & Lauterman, 2012). With her book, *Words Onscreen: The Fate of Reading in a Digital World* (2015), Naomi Baron brings more data to the case for print. In a survey of over 300 university students in the U.S., Japan, Germany, and Slovakia, the author found a common preference for print, especially for reading long texts. When students were given a choice of different media—including hard copy, cell phone, tablet, e-reader, and laptop—92% reported that they could concentrate best in hard copy. Furthermore, the American textbook publisher Scholastic found in 2015 that "nearly two-thirds of children (65%)—up from 2012 (60%)—agree that they'll always want to read print books even though there are e-books available"[84]. On the same line, the results of last four years researches on the impact of digitisation on reading

[83]See https://www.theguardian.com/books/2017/apr/27/screen-fatigue-sees-uk-ebook-sales-plunge-17-as-readers-return-to-print, accessed 08/08/2018.

[84] N. S. Baron, *Words onscreen: the fate of reading in a digital world* (New York: Oxford University Press, 2015); see also A. Rob, *92 Percent of College Students Prefer Reading Print Books to E-Readers*, New Republic (Jan. 14, 2015), http://www.newrepublic.com/article/120765/naomi-barons-words-onscreen-fatereading-digital-world, accessed 18/08/2018.

practices conducted by the members of the European research initiative COST E-READ[85] have shown that paper remains the preferred reading medium for longer single texts, especially when reading for deeper comprehension and retention, and that paper best supports long-form reading of informational text. The 2018 *Stavanger Declaration*[86], signed by over one hundred scholars and scientists, summarizes the outcomes of the COST Action concluding that the transition from paper to digital is not neutral and exhorts for caution when introducing digital technologies to education.

Why is this the case? How can digital reading be improved? The main reasons why e-reading did not overcome reading on print might be summarized as the following:

- Implication for the metacognitive performance (Ackerman and Lauterman, 2012) and for the learning efficiency (Mangen et al., 2013);
- Pragmatic reasons to learn how to use digital devices for the long read. Screens are (still) connected with leisure time (smartphones) or work (stress), not with the long read. So, pragmatics of discourse could explain a difference: habits of reading functions;
- Disruptive effects on the reading performance linked to the shallow reading;
- Influence of the digital medium on the kinaesthetic and tactile feedback provided to the reader. The haptic perception of the digital device might reduce the pleasure of reading;
- Social prestige carried by printed books in Western society;
- Implication for health such as 'iPad neck', eyestrain, visual fatigue and screen-related sleeplessness.

The present article aims at contributing to the present discussion on reading on paper vs. digital reading by observing the advantages and disadvantages of paper vs. digital dictionaries for vocabulary learning in a foreign language.

6.2. Embodied feel and increase prestige of digital reading

The understanding of how reading on paper is different from reading on screens might be attributed to different causes. The first is concerned with the psychological aspects of reading behaviour. Screens make it difficult for readers to construct an effective cognitive map, or a topography, of the text (Li, Chen, & Yang, 2013; Payne & Reader, 2006). Paper books are easily navigable and offer to the reader plainly defined domains: the left and right pages, the

[85] See http://ereadcost.eu/, accessed 29/03/2019.

[86] See http://ereadcost.eu/stavanger-declaration/, accessed 29/03/2019.

eight corners with which to orient oneself. A reader can focus on a single page of a paper book without losing sight of the whole text; one can see where the book begins and ends and where one page is in relation to those borders. Thanks to these features it is easier to construct a coherent mental map of texts that researches have shown to have a central role in the navigational performance (i.e., searching for or locating a piece of textual information), reading speed, content recall, and reading comprehension (Li et al., 2013; Payne & Reader, 2006). The cognitive map is particularly important when it comes to look up a word in the paper dictionary, since one has to flip to the pages and scan through a list of words in order to find the section of interest. Other aspects that influence the text processing are haptics and the embodiment of reading (Mangen & Schilhab, 2012; Mangen, 2008). When we read a print book or on an e-reader, we engage in human–technology interactions involving the body, the mind-brain, and a technology or medium (with its interface and affordances). Movement and object manipulation might affect the reading act. Screens and e-readers fail to adequately recreate certain tactile experiences of reading on paper that many people miss and, more importantly, prevent people from navigating long texts in an instinctive and enjoyable way (Gerlach & Buxmann, 2011). Subjects of a study reported "feeling awkward while manipulating the iPad during reading"[87]. Readers can feel disoriented because they miss the typical experiences related to reading on paper such as the tactile feel of holding the book in their hands, tinkering with the pages, feeling the paper on their fingertips (Mangen & Kuiken, 2014). The lack of the paratextual information (cover, color, footnotes, indication of pages) makes the digital text more fluid and less stable than the paper text. This should be detrimental for the purpose of learning and memorizing in particular that typically demand a precise localization and storage of information. A related explanation are the differences in metacognitive performances, i.e. the subjective knowledge level evaluation during the learning process. Digital texts imply a form of shallow reading while reading on paper seems more associated with deep reading. In the study carried out by Ackerman & Goldsmith (2011), it was found that there was a lower test performance on screen compared to on paper.

However, this difference was only observed when study time was fully regulated (unlimited study time) by the participants, as paper readers generally perform better and choose to spend more time with the text. Performance level was similar when study time was fixed and not controlled by the participants. Under both conditions subjective knowledge assessment was

[87] A. Mangen & D. Kuiken, "Lost in an iPad: Narrative engagement on paper and tablet", *Scientific Study of Literature*, *4*(2), 15-177, (2014).

overestimated on screen and more accurate on paper. These findings suggest that media does not affect learning itself but rather the effectiveness of learning management. More and more research is showing how stressful digital environments are and how this impacts negatively on the last generation. Thus, reading on paper seems to also be a way to cognitive overload as a consequence of our digital environments.[88]

A further aspect to be considered is the social significance carried by the old-fashioned reading support. Books are cultural artifacts, sometimes treasured ones. You might find them housed in museums and special collections like the Book of Kells in the Old Library at Trinity College, Dublin. They can be embedded within national histories like in Germany, where the legendary Frankfurt Book Fair has a tradition spanning more than 500 years. The first book fair was held in 1454, soon after Johannes Gutenberg had developed printing in movable letters in Mainz.

Nowadays, the importance of the physicality of books is emphasized by the new trend of the book photography. Books represent pieces of art that people have in their house and that they show using social communities such as Instagram: #bookphotography, #booklover or #bookstagram[89] are just a few examples where users shoot and post their current reading situation or pictures of their favourite books. As the more than 20 million posts show, the paper book continues to be desirable because it carries with it a material presence and a social prestige that books still have in our world. It's very difficult to explain the resistance of the paper in our digitized world. The social prestige might offer a clue to the reasons why texts on screen are taken less seriously than texts on paper (Salgaro et al., 2018). Indeed, there are studies showing that readers are less inclined to take screens seriously as a reading surface (Singer & Alexander, 2017; Delgado et al., 2018). These data are worrying since e-books and tablets are largely integrated in didactic activities, i.e., mobile-assisted learning.

6.3. Capitalize on the benefits of digital reading for learning

Digital tools for didactic purposes are a huge trend nowadays, used every day not just outside schools or universities but also inside the classroom. Their popularity encompasses everything from social media to websites, for example, *Facebook*, *YouTube*, and *Google Apps for Education*, and no doubt there are a lot more to come in the future. Digital reading has a very

[88] See Massimo Salgaro and Adriaan van der Weel, "How reading fiction can help you improve yourself and your relationship to others", http://theconversation.com/how-reading-fiction-can-help-you-improve-yourself-and-your-relationship-to-others-88830, accessed 08/08/2018.

[89] See https://www.instagram.com/explore/tags/bookstagram/, accessed 08/20/2018.

strong potential in terms of language learning, most notably of learning of a foreign language. The growing popularity of Mobile-assisted Language Learning (MALL) is evidence of that. A review of mobile learning projects funded by the European Union since 2001 (Pęcherzewska & Knot, 2007) confirms that mobile phones are the most frequently used device in these projects, followed by personal digital assistants (PDAs).

Incorporating new technologies in the language learning process has many advantages, it allows learners to foster communication, creativity, collaboration and critical thinking. Thanks to ICT, learners can easily make use of authentic resources that promote inter-cultural understanding and interact with virtual peers in real contexts. For these reasons, students can be motivated to learn in the way in which they are most interested in and have fun in their learning activity. Recently several apps for learning foreign languages on the smartphone, i.e. *Duolingo, Babbel, Memrise, Busuu* became more and more popular.

Digital reading is a valid support of reading comprehension of literature, too. It is well-known that reading in a foreign language is one of the best ways to improve the knowledge of it, expand the vocabulary and observe the grammar in the context. But it can become a really frustrating activity, when the reader does not know key words and has to open and close a dictionary every few lines and to keep falling out of the narrative. The dictionary on e-readers is one of the functions that makes the reading experience in a foreign language more flexible and pleasant, since it permits looking at the meaning of a word by simply pressing on it and the definition from the dictionary pops up. Furthermore, e-readers such as Kindle[90] (6th Generation and newer) offer the Vocabulary Builder feature. With Vocabulary Builder, the reader can, besides looking up words with the dictionary, memorize their definitions and create flashcards to learn them. For both parents and educators, knowing whether technologies are improving or compromising education is a question of concern. With the diffusion of e-books, online learning and open educational resources (OER), researchers have been trying to find out whether students do as well when reading a given text on a digital screen as on paper. Within this literature, differences across mediums have been found in terms of speed of processing, text recall, and reading comprehension (e.g., Kerr & Symons, 2006; Mangen, Walgermo, & Brønnick, 2013).

[90] We focus on one distributor of e-books, Amazon, because it is the main player in the e-books market with shares reaching close to 70% in the US, 60% in the UK and around 40% in Germany and Spain (Wischenbart, 2014; Li, 2014).

6.3.1. The role of (e-)dictionaries in the vocabulary acquisition process. Literature review

Vocabulary learning is an essential part in the foreign or second language learning process (Summers, 1988). One of the main strategies of vocabulary learning consists of dictionary use. "When students travel, they don't carry grammar books, they carry dictionaries" (Krashen, as cited in Lewis, 1993: iii). As crucial self-learning instruments, dictionaries have many different types considering their language basis and design. Regarding their language basis, there are monolingual dictionaries which offer the definitions in the target language and bilingual dictionaries which present definitions in native-to-target or target-to-native languages. Taking their designs into account, there are print dictionaries in hard copy forms and electronic dictionaries which can be divided into two types; online dictionaries and off-line dictionaries. Knight (1994) investigated the practice of using dictionaries while reading. Her results showed that "subjects who used the dictionary not only learned more words but also achieved higher reading comprehension scores than those who guessed from context. In addition, correlations between actual number of words looked up and recall scores reinforce the finding that comprehension does not suffer as a result of dictionary use" (Knight, 1994: 295). There are divergent opinions regarding dictionary consultation while reading in a foreign language. Educators following the grammar-translation methods have supported the extensive use of dictionaries in order to decode text. However, current communicative approach in the didactic of a foreign language focus on strategic reading and inferring the meaning of unknown words from context. Those who are sceptical regarding dictionary consultation believe that its excessive use might disrupt the comprehension process and hinder short-term memory involved in vocabulary learning. They encourage print exposure, since they believe that it is more effective and helpful learning words inferring from context (Grabe & Stoller, 2001). Numerous studies focusing on post-reading vocabulary and comprehension scores of students with or without the use of dictionaries (Bogaards, 1998; Knight, 1994; Luppescu & Day, 1993) have reported divergent results, but most are more inclined to show that dictionary use can enable better comprehension depending on learners' proficiency level and other factors too.

From the publishing perspective, in the last years the sale of numerous print dictionaries such as Oxford English Dictionary have fallen due to the increasing popularity of the digitalized version and many publishers made the decision to stop the press and go 100% digital.[91] In his

[91] See https://www.telegraph.co.uk/culture/books/booknews/7970391/Oxford-English-Dictionary-will-not-be-printed-again.html, accessed 08/29/2018.

update on the world's lexicographical services, Lan (2005) stated that online dictionaries are the main support of word reference for many people. The emergence of the internet and Google made the original concept of a paper dictionary as a book and a language-learning aid close to becoming obsolete. The advent of electronic dictionaries has raised the inevitable question of whether electronic dictionaries have a similar effect to that of paper dictionaries. Consulting print dictionaries is considered by many to have the disadvantage of being too time-consuming, while the digitalized one are faster, easier and more practical to use. Dictionaries of all types are available online (with type in or pop-up function), as apps for smartphones and for tablet computers or in electronic pocket format. In the last years a large body of studies were devoted to compare and to investigate the usefulness of paper and electronic dictionaries. These studies investigated mainly, i) time for word retrieval, ii) the number of target words retained, iii) the accuracy of selecting L1 equivalent, and iv) learners' impressions of the dictionaries (Nesi 2000; De Schryver 2003; Stirling 2003; Midlane 2005; Kobayashi 2008, Chen 2010, Xu 2010; Dziemianko 2010,2011, 2012).

6.3.2. Studies reporting advantages in the use of electronic dictionary

The proponents of the electronic dictionary use believe that 1) it is more useful with receptive and productive tasks and 2) it is a better learning tool since its use can reinforce word retention because the ease and speed of use does not interrupt the reading flow and reduces cognitive load and as a result, affords greater comprehension.

Dziemianko (2010) compared the usefulness of a monolingual English learners' dictionary in electronic (online) and paper form in receptive and productive tasks. The results show that the subjects consulting the electronic dictionary performed both tasks much better than those using the paper dictionary. Likewise, the results of the retention test (after one week) indicated that the consultation of the electronic dictionary was more beneficial to remembering both the meaning of the target words and prepositions.

Similar results were presented by Laufer (2000), who investigated incidental vocabulary acquisition in two reading conditions: when unknown words were encountered in a paper text and glossed in the margin, and when they were read on computer screen and explained in a computer dictionary. The group using the electronic dictionary performed significantly better than the 'paper group' in the comprehension task of low frequency words (immediately after the reading session) and in long term retention (after two weeks).

The study of Zhiliang (2008) reinforces the belief that a more extensive dictionary search could increase incidental vocabulary acquisition. The research focused on three learning strategies: 1) guessing from context, 2) using e-dictionary, 3) combined guessing and e-dictionary method — on EFL[92] student. The results showed that the students using the combined guessing and e-dictionary method significantly outperformed students in the other two groups. One of the reasons explaining these findings might be that the mental effort of working out the correct meaning of a word in a given context and of looking up the definitions of it might promote better memorization. Furthermore, the author argues that the visual impact created by the pop-up window of a word's entry might play an important role too, since it guides student's attention on the unfamiliar word, which created a memory trace of the word and might contribute to its acquisition. This aspect refers to Schmidt's "noticing hypothesis", a hypothesis suggesting that input does not become intake for language learning unless it is noticed, that is, consciously registered (Schmidt, 1991).

In the same line, the experiment carried out by Liu and Lin (2011) on the effects of three types of dictionaries (pop-up online dictionaries, type-in online dictionaries, and printed dictionaries) showed that the group using the pop-up dictionary performed better than the other two in terms of vocabulary learning efficiency, but not of comprehension. This study differed from others because authors controlled for the information provided by various dictionaries[93] and focused on exploring the nature of its associated processes (e.g., vocabulary and text reading) in relationship to participants' subsequent performance. Subjects did not receive the target items to search, but they were free to check any words they wished. After reading a vocabulary matching test a comprehension task was submitted.[94] The better vocabulary performance registered in the pop-up dictionary condition might be related to the fact that students using the pop-up dictionary consulted it twice as many times as students using the other two types of aids. According to the authors, the difference in the consultation frequency can be explained to the fact that students had to exert more effort when using the book dictionary in comparison to the pop-up support, as showed by the average vocabulary searching time (longer in the paper condition).

[92] English as a foreign language.

[93] In order to keep the contents of the three dictionaries the same across conditions, researchers created a specific printed version of a book dictionary for this study. Words that did not appear in the text were omitted in all dictionaries to reduce the possible distractions from irrelevant words.

[94] In the vocabulary task, students were asked to match the 15 pre-selected items to their definition, while for the comprehension test, they received 10 multiple-choice questions.

The beneficial effect of using an e-dictionary was evidenced in long-term study too, conducted by Alharbi (2016) over a full semester in the Saudi Arabian context. Four groups of 35 students were created: 1) using a pop-up dictionary; 2) using a type-in dictionary; 3) using a book dictionary; and 4) with no dictionary (control group). The findings showed that the pop-up and type-in group had significantly higher scores than the book dictionary group on both the comprehension test and the vocabulary test. The qualitative data reported that student's most favored type of dictionary was the pop-up dictionary. According to the author it is reasonable to think that pop-up dictionary use helped to reduce cognitive load, therefore subjects had more time to concentrate on text reading and comprehension.

Guillot and Kenning (1993) underline the motivational function of electronic dictionaries. According to the researchers, electronic dictionaries encourage students to look up more unknown words and "enabled students to leave no stone unturned, and gave them a degree of control over the materials, and momentum," and that leads to the reason why the electronic dictionary can "generate its own learning impetus" (1993: 72-73).

6.3.3. Studies reporting advantages in the use of paper dictionary

The speed of electronic vocabulary consultation represents valid support when a learner needs to produce a word mid-conversation or hears something that completely hinders their comprehension, but according to some researchers that aspect might lead to a great distraction and compromise in the vocabulary learning process (Stirling, 2005). On the other hand, when students search for a word in a paper dictionary, they have to engage with it: for example, they have to 1) look at the word carefully to try to remember spelling, 2) search for it in the dictionary alphabetically (probably returning to the text to check spelling), 3) eye-scan the dictionary page and reject other words, 4) see translation or definition. All those passages imply a deeper processing which helps the fixation of the lexical item into the learner's brain. As Schmitt and McCarthy write "the more cognitive energy a person expends when manipulating and thinking about a word, the more likely it is that they will be able to recall and use it later […] learning strategies which involve deeper engagement with words should lead to higher retention than 'shallower' activities."[95] According to the "the depth of processing" hypothesis (Hulstijn & Laufer, 2001) an elaborate process for acquiring new lexical information leads to higher

[95] Schmitt, N. & M. McCarthy, *Vocabulary: Description, Acquisition and Pedagogy* (Cambridge University Press, 1997), p.3.

retention. Consequently, the words searched in a longer process through a hard copy dictionary could be retained better than those looked up in an electronic dictionary. This hypothesis was explored empirically by Koyama and Takeuchi (2004) in a study[96] in a Japanese University found no significant difference regarding the number of words searched and the search time, but that the words searched with a printed dictionary resulted in better retention (after one week) than those with an electronic one.

The study comparing the effects of using printed dictionaries, pocket electronic dictionaries, and online type-in dictionaries on vocabulary retention carried out by Li-Ling& Liu (2013) in a Taiwanese junior high school bring further data in favour of the printed dictionary. The study adopted a mixed-methods research methodology with within-subject design. All participants (33) were measured under the three types of dictionaries. The task consisted in reading three adapted articles (of 300 words) in English with a different lexical support and looking up 15 target marked words. Results reported no significant differences among the three types of dictionaries. This indicates that all three types of dictionaries were equally helpful with regard to keeping the target items in the learners' short-term memories. In the two delayed vocabulary tests (two and four weeks after the reading session) results evidenced that that use of a printed dictionary was the most effective in helping the participants to retain the target words in their long-term memories, while the pocket electronic dictionaries and online type-in had similar effects. This finding, however, contrasts with that of Liu and Lin (2011), who suggested that the effort involved with looking up vocabulary would hinder vocabulary learning.

6.4. Conclusion

Vocabulary acquisition occupies a key position in learning a second language. How vocabulary is acquired and what the most effective means are to promote effective acquisition are worthwhile lines of investigation in the field of second language acquisition. According to the studies reported above, the use of paper dictionaries seems to enhance long-term retention of new words. However, it is difficult to generalize these results since studies of the use of dictionaries are relatively few and their methodologies, type of dictionary adopted, subjects'

[96] Researchers compared English learners reading in paper and electronic dictionary conditions. The experiment consisted of two parts. In the first part, participants (18) had to read two-texts selected from an English-reading textbook without a dictionary and answer the vocabulary test with a dictionary (pocket electronic or paper). In the second part (seven days after) subjects had to answer to recall and recognition tasks. They had to 1) write the translation of 4 target words from the texts and 2) quote the correct usage examples in English from the dictionary of 4 other words.

native language, and the same outcomes are different. More importantly the implicit concepts of what is understood as learning differs widely. Dictionary use as strategy of vocabulary learning deserves more attention in second language vocabulary research and pedagogy, simply because foreign language acquisition is one of the key competences also in a digital society.

References

Ackerman, R., & Goldsmith, M. (2011). Metacognitive regulation of text learning: On screen versus on paper. *Journal of Experimental Psychology: Applied,* 17(1), 18–32.

Ackerman, R., & Lauterman, T. (2012). Taking reading comprehension exams on screen or on paper? A metacognitive analysis of learning texts under time pressure. *Computers in Human Behavior*, 28(5), 1816–1828.

Alharbi, M. A. (2016). Using different types of dictionaries for improving EFL reading comprehension and vocabulary learning. *JALT CALL Journal*,12(2), 123–149.

Baron, N. (2015). *Words onscreen: the fate of reading in a digital world* New York: Oxford University Press.

Bogaards, P. (1998). Using dictionaries: Which words are looked up by foreign language learners? In B. T. S. Atkins, & K. Varantola (Eds.). *Studies of dictionary use by language learners and translators*), Tubingen, Germany, 151–157.

Bradford, P. (2006). The Blackboard Learning System. *Conference on Instructional Technologies*, 15, 61–62.

Chen, Y. (2010). Dictionary use and EFL learning: A contrastive study of pocket electronic dictionaries and paper dictionaries. *International Journal of Lexicography,* 23 (3), 275–306.

Chun, D. M., & Plass, J. L. (1996). Effects of multimedia annotations on vocabulary acquisition. *The Modern Language Journal*, 80 (2), 183–198.

Delgado, P., Vargas, C., Ackerman, R., & Salmerón, L. (2018). Don't throw away your printed books: A meta-analysis on the effects of reading media on reading comprehension. *Educational Research Review, 25*, 23–38.

Duff, A., & Maley, A. (1990). *Literature*, Oxford: Oxford University Press.

Dziemianko, A. (2010). Paper or electronic? The role of dictionary form in language reception, production and the retention of meaning and collocations. *International Journal of Lexicography,* 23(3), 257–27.

Gerlach, J., & Buxmann, P. (2011). Investigating the acceptance of electronic books: The impact of haptic dissonance on innovation adoption. *European Conference on Information Systems (ECIS).*

Grabe, W., & Stoller, F. (2001). Reading for academic purposes: Guidelines for the ESL/EFL Teacher. In M. Celce-Murcia (Ed.), *Teaching English as a second or foreign language*, 187–203.

Guillot, M-N., & Kenning, M-M. (1994). Electronic monolingual dictionaries as language learning aids: A case study. *Computers in Education,* 23, 63–73.

Hacker, D.J., Dunlosky, J., & Graesser, A. C. (2009). *Handbook of metacognition in education*, New York: Routledge.

Kerr, M. A., & Symons, S. E. (2006). Computerized presentation of text: Effects on children's reading of informational material. *Reading and Writing*, 19(1), 1–19.

Knight, S. (1994). Dictionary use while reading: The effects on comprehension and vocabulary acquisition for students of different verbal abilities. *The Modern Language Journal,* 78, 285–298.

Kobayashi, C. (2008). The use of pocket electronic and printed dictionaries: A mixed-method study. In Bradford-Watts, K., Muller, T. and Swanson, M. (eds.). *JALT 2007 Conference Proceedings*, Tokyo: JALT, 769–783.

Komura, Y., Shitara-Matsuo, Y., Ishii, Y., Uchida, S., Kawamura, A., & Kanazashi. T. (2006). An analysis of the Oxford advanced learner's dictionary of current English, seventh edition, with special reference to the CD-ROM. *Lexicon*, 36, 55–146.

Koyama, T., & Takeuchi, O. (2004). Comparing electronic and printed dictionaries: How the difference affected EFL learning. *JACET Bulletin*, 38, 33–46.

Lan, L. (2005). The growing prosperity of online dictionaries. *English Today*, 21(3), 16–21.

Laufer, B., & Hill, M. (2000). What lexical information do L2 learners select in a CALL Dictionary and how does it affect word retention? *Language Learning and Technology*, 3/2, 58–76.

Laufer, B., & Hulstijn, J. (2001). Incidental vocabulary acquisition in a second language: the construct of task-induced involvement. *Applied Linguistics*, 22(1), 1–26.

Lazar, G. (1993). *Literature and language teaching: a guide for teachers and trainers*, Cambridge: Cambridge University Press.

Lazar, G. (1994). Using literature at lower levels. *ELT Journal*, 48(2), 115–124.

Lewis, M. (1993). *The lexical approach: The state of ELT and a way forward*, Hove, England: Language Teaching Publication.

Li-Ling, C., & Gi-Zen, L. (2013). Effects of printed, pocket electronic, and online dictionaries on high school students' English vocabulary retention. *The Asia-Pacific Education Researcher*, 22(4), 619–634.

Liu, T.-C. & Lin, P.-H. (2011). What comes with technological convenience? Exploring the behaviors and performances of learning with computer-mediated dictionaries. *Computers in Human Behavior*, 27(1), 373–383.

Luppescu, S., & Day, R. R. (1993). Reading, dictionaries, and vocabulary learning. *Language Learning*, 43, 263–287.

Mangen, A. (2008). Hypertext fiction reading and immersion. *Journal of Research Reading*, 31(4), 404–419.

Mangen, A. (2013). The digitisation of narrative reading – theoretical considerations empirical evidence in the unbound book. In J. Kircz, & A. van der Weel (Eds.), *The unbound book*. Amsterdam: Amsterdam University Press, 91–106.

Mangen, A., Walgermo, B. R., & Brønnick, K. (2013). Reading linear texts on paper versus computer screen: Effects on reading comprehension. *International Journal of Educational Research*, 58, 61–68.

Mangen, A., & Kuiken, D. (2014). Lost in an iPad –Narrative engagement on paper and tablet. *Scientific Study of Literature* 4(2), 150–177.

Nesi, H. (2000). On screen or in print? Students' use of a learner's dictionary on CD-ROM and in book form. In Howarth, P. and Herington, R. (eds.), *EAP Learning Technologies*. Leeds: University Press, 106–114.

Nesi, H., & Haill, R. (2002). A study of dictionary use by international students at a British university. *International Journal of Lexicography*, 15/4, 277–305.

Payne, S. J., & Reader, W. R. (2006). Constructing structure maps of multiple on-line texts. *International Journal of Human - Computer Studies*, 64(5), 461–474.

Pęcherzewska, A., & Knot, S. (2007). Review of existing EU projects dedicated to dyslexia, gaming in education and m-learning. *WR08 Report to CallDysc project*. Available at: http://www.docstoc.com/docs/40115316/WR08-Existing-EU-Projects-review.

Salgaro M., Sorrentino P., Lauer G., Lüdtke J., & Jacobs, A. M. (2018). How to measure the social prestige of a Nobel Prize in literature? Development of a scale assessing the literary

value of a text. In *TXT*, N°5, The Book Issue. Academic Press Leiden and Amsterdam University Press, 138–148.

Schmidt, R. (1990). The role of consciousness in second language learning. *Applied Linguistics* 11/1, 129–158.

Schmitt, N., & McCarthy, M. (1997). *Vocabulary: Description, acquisition and pedagogy*, Cambridge: Cambridge University Press.

Shizuka, T. (2003). Efficiency of information retrieval from the electronic and the printed versions of a bilingual dictionary. *Language Education and Technology*, 40, 15–33.

Stirling, J. (2005). The portable electronic dictionary: Faithful friend or faceless foe? *Modern English Teacher* 14/3, 64–71.

Tono, Y. (1984). *On the dictionary user's reference skills*. Unpublished B. Ed. Thesis, Tokyo: Tokyo Gakugei University.

Xu, X. (2010). Study on the effect of dictionary use on second language incidental vocabulary acquisition: An empirical study of college English vocabulary learning strategy. *Journal of Language Teaching and Research* 1(4), 519–523.

Websites consulted

E-READ COST, http://ereadcost.eu/, accessed 29/03/2019.

Federation of European Publishers (FEP), https://fep-fee.eu/The-Federation-of-European-844, accessed 08/24/2018.

New Republic, http://www.newrepublic.com/article/120765/naomi-barons-words-onscreen-fatereading-digital-world, accessed 18/08/2018.

Instagram, https://www.instagram.com/explore/tags/bookstagram/, accessed 08/20/2018

The Conversation, http://theconversation.com/how-reading-fiction-can-help-you-improve-yourself-and-your-relationship-to-others-88830, accessed 08/08/2018

The Guardian, https://www.theguardian.com/books/2017/apr/27/screen-fatigue-sees-uk-ebook-sales-plunge-17-as-readers-return-to-print, accessed 08/08/2018.

The Telegraph, https://www.telegraph.co.uk/culture/books/booknews/7970391/Oxford-English-Dictionary-will-not-be-printed-again.html, accessed 08/29/2018.

The Vintage new, https://www.thevintagenews.com/2016/06/28/library-trinity-college-dublin-300-year-old-library-home-200000-books-bookworms-heaven-earth-2/, accessed 28/03/19.

7. Paper or online dictionary use? Pragmatic learning first. A pilot study on vocabulary knowledge extension in EFL

Authors: Pasqualina Sorrentino, Massimo Salgaro, Jennifer Lorenz, Gerhard Lauer

Abstract

Vocabulary learning needs special strategies in the language learning process. The use of dictionaries is of a great help in vocabulary learning and nowadays the emergence of digital dictionaries has added a new and valuable resource for this type of learning. The present study aims to explore the effects of bilingual online dictionaries (O) vs. paper dictionaries (P) on vocabulary learning and retention of German EFL learners. Forty-five students joined the experiment at a language centre run by a university. Before the experiment, a preliminary English test was conducted in order to assess whether the participants had at least a B2 level of English. The participants were randomly assigned to the online, paper and a control group. The experiment was conducted in four sessions during the winter semester 2019-2020. Fifteen new target words were selected in order to be acquired in this study in the context of a literary text reading. The online group participants were asked to use the online dictionary on their mobile phone (Pons Online dictionary). The participants of the paper group used Pons Paper Dictionaries for finding the meaning of words. In order to check their short-term and long-term vocabulary learning, all participants took part in an immediate and two delayed post-tests respectively after the treatment. Based on the results, for the long-term vocabulary acquisition no statistical differences between the groups could be found. In the short-term test users of paper dictionaries performed slightly better on an exercise on the correct spelling of words than the control group. The only difference that was found between the usage of the online and paper dictionaries is that students rate the user-friendliness of the latter slightly higher.

Acknowledgments

We thank E-READ COST, the Language Centre of University of Göttingen (ZESS); Prof. Roel Willems of Radboud University for the support in the experiment design and PONS-Verlag for providing the dictionaries used in the study.

7.1. Introduction

Vocabulary acquisition is an important subject in the didactic of a foreign language. Once learners are familiar with the basic structures of the target language, they want to start saying and understanding more words. Learners need to notice language features in order to acquire them (Schmidt, 2001). When students want to learn new vocabulary, for instance, they need to notice unknown words and pay sufficient attention to them. Retention of new words is further determined by the way in which these words are processed, whereby deeper and more elaborate processing results in better words. Dictionary use represents one of the main useful and easily accessible sources learners address to. The digitalization fostered a great diffusion of online dictionaries. Nowadays students, instead of getting lost in leafing through a heavy paper dictionary, just need to insert the unknown word in the internet using their smartphone, tablet, computer or laptop to find its meaning or synonym, antonym, as well as its pronunciation.
The present study was carried out in order to see if there were any significant differences between online and paper dictionaries in the learning and retrieval of new words in the context of English second/foreign language learning.

7.2. Background research

The technological evolution brought a contribution in the didactic of a foreign language. In recent years, numerous applications were developed in computer-assisted language learning (CALL). An important focus is given on vocabulary acquisition and dictionary use. Digitalization increases the popularity of electronic and online dictionaries[97], especially for their easy accessibility and use, their variety and their economical price. Technology changed the way we access to the meaning of new words, instead of leafing through a paper book, we just need a few mouse-clicks in the Internet to find the target word. E-readers such as Amazon

[97] In the 1990's James-Catalano [7, c. 31] for the first time referred to electronic dictionaries as a 'valuable tool in the quest for knowledge'. Now it's considered to be not only a great pedagogical but communicative tool. The term electronic dictionary (ED) can be used to refer to any reference material stored in electronic form that gives information about the spelling, meaning, or use of words [10, c. 839]. Electronic dictionaries may be divided into two main groups: those intended to be used interactively by people for consultation or reading, and those intended to be used automatically by computers for various applications, for instance in language technology contexts such as machine translation. An electronic dictionary can be intended for use off-line and on-line [13, c. 438]. An off-line dictionary is stored with the individual user, either in a personal computer (PCD), or in an electronic pocket calculator or reading pen (PED). An on-line dictionary has been published on the internet and is consulted via the internet; it is thus not stored with the individual user. While the off-line dictionary, like the print dictionary can be regarded as a finished product, the on-line dictionary is in principle an unfinished product that can be continuously revised and enlarged, etc.

Kindle or Apple iPad tablet are popular examples of mobile devices that give readers and learners the possibility to look up the meaning of unknown words in many dictionaries directly from a book through the pop-up function. Because of the change mentioned it is necessary to study the role played by online and electronic dictionary for vocabulary acquisition in the didactic of a foreign language.
Depending on the purpose of their required usage, there are different formats of dictionaries:

Printed dictionaries
Printed dictionaries are presented in different versions from a tiny pocket-sized format that are affordable and easy to carry anywhere to an extensive multi-volume works.

Pocket dictionaries/ Handheld Electronic dictionaries
Pocket dictionaries are small devices that receive input through a keyboard or voice identification. Some devices present a scanning function that enables to read printed text. The translation is displayed on a LCD screen and there is the possibility to listen to the correct pronunciation.

Dictionary programs
These are software designed for Computer use that allocates words or phrases to be entered and translated on a computer monitor. Within this kind of dictionaries, there are pop-up electronic dictionaries such as those installed on the Windows operating system or on e-reader devices. These are readily available for use with a move of a cursor or a "double-click on any given word to bring up a definition" (Liu & Lin, 2011, p. 373).

Online dictionaries
Online dictionaries are close to dictionary programs; these are often uncomplicated to search and present a type-in function. Users need to insert the unknown word in order to start the search. The most dictionary apps for smartphones use that process.

One of the first scholars working on the use of dictionary in the didactic of a foreign language was Knight (1994). She investigated the practice of using dictionaries while reading. Her results showed that "subjects who used the dictionary not only learned more words but also achieved higher reading comprehension scores than those who guessed from context. In addition, correlations between actual number of words looked up and recall scores reinforce the finding

that comprehension does not suffer as a result of dictionary use" (Knight, 1994: 295). In their experiment, Alharbi (2016) and Al-Shehri and Gitsaki (2010) let subjects read passages on a computer with access to an online dictionary. In both experiments, participants using the online dictionary had better results on the subsequent vocabulary test compared to the group that did not use a dictionary. Experiments comparing online to paper-based dictionaries provide mixed results. Dziemianko (2011, 2012) and Chen (2012) did not find significant differences for vocabulary acquisition between the two kind of dictionaries, but Dziemianko (2010, 2017) found that students using online dictionaries could learn more words, phrases, and collocations compared to paper-based dictionaries. Liu and Lin (2011) and Alharbi (2016) reported that subjects acquired the meanings of words faster when accessed through a pop-up dictionary as opposed to a type-in dictionary.

Some studies suggest that learners have a better text comprehension when they use an online or paper dictionary compared to not using a dictionary at all (Chun, 2001; Goyette, 1997; Knight, 1994). According to other studies there is no significant difference in term of comprehension when different types of dictionaries are used (Aust, Kelly & Roby, 1993; Liu & Lin, 2011; Prichard & Matsumoto, 2011), although Alharbi (2016) found that the passage comprehension for participants who used a pop-up dictionary was higher than for participants who used a type-in dictionary, paper dictionary, or no dictionary. To our knowledge, there has not been a study that compares the effects on comprehension when learners completely transfer their attention away from a long literary text (short novel) to access unknown words by typing to an online dictionary smartphone versus looking for the words in a paper dictionary.

In light of the pervasiveness of digital medium in everyday life and in the educational field, the lack of sufficient instructions for teachers to make decisions about their teaching and learning strategies is disconcerting. Increasing our understanding of the influence of digital devices on learning processes is necessary in order to inform educators about the implications of their use on learners' performances. In the past years numerous researches were carried out and reported conflicting results in learning between digital and paper reading in part due to advances in technology and design features. In a study at an Indiana State University Jim Johnson (2013) found that students did equally well on a test whether reading from a digital book or a printed one, while Mangen, Walgermo, and Bronnick (2013) in a study comparing reading non-fictional texts on paper and on digital support within high school students found better results for paper readers in term of higher comprehension scores compared to digital readers.[98]

[98] See Jim Johnson, "Students perform well regardless of reading print or digital books," *ScienceDaily*, May 24, 2013; Anne Mangen, Bente R. Walgermo, and Kolbjorn Bronnick, "Reading linear texts on paper versus

The findings of recent meta-analyses on the medium effect on reading performances should be a matter of concern (Clinton, 2019; Delgado, Vargas, Ackerman, & Salmerón, 2018). In their meta-analysis scholars looked at reading times and calibration of performance (metacognition) between reading text from paper compared to screens. Their results demonstrated that subjects comprehend less the same non-fictional texts on screen than on paper. Furthermore, there are study approaching the digital vs paper reading from other perspectives, Salgaro et. al. (2018), for example investigate whether paper books and e-books carry a different kind of social prestige for the readers and if so, whether the perception of the prestige might influence the evaluation of the literary texts within an antique book and an e-book. In order to measure the effect of social prestige, the authors developed a questionnaire for the evaluation of the literary quality by readers. According to their results, the preconceptions of the readers towards a certain medium of reading, plays a determinant role in the attribution of literary value of a text. and we created the following items:

In the dictionary filed, there are numerous controversial discussions related to the advantages or disadvantages of paper vs. online support, and the number of researches on the topic is still scarce, this study is an attempt to investigate the contribution of paper dictionaries and online dictionaries to German EFL learners' vocabulary learning. Given the above presented findings, the following research questions will be analysed in this study:

1. Is there a difference between the effect of online dictionaries and paper dictionaries on the learning of new vocabulary in an EFL context?

Specifically, we are interested to what extent the paper and online conditions differ in their effect on learners':

a) vocabulary acquisition: recognition and meaning of target words;

b) memorization of those words;

c) comprehension of a reading passage;

d) long-term retention of target words (after one and two weeks);

2. Does the paper dictionary carry social prestige?

3. What is students experience in using dictionaries?

computer screen: Effects on reading comprehension", *International Journal of Educational Research*, Vol. 58 (2013): 61–68.

7.3. Experimental setup

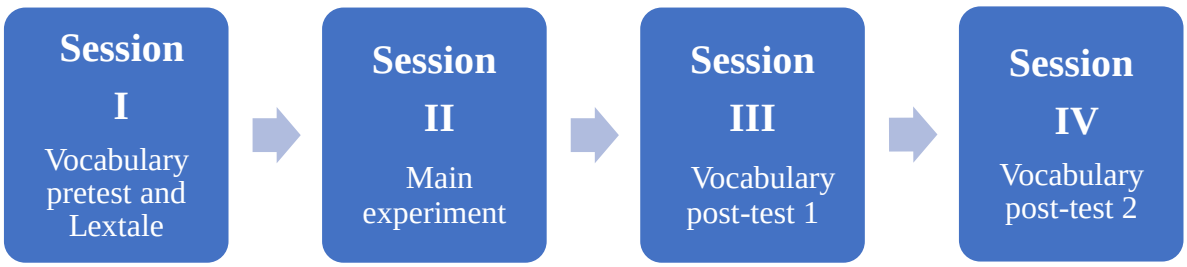
7.3.1. Participants

The participants in this study were students of various university faculties of the University of Göttingen attending a B2 CEFR English class at the Language Centre of the same university. In total 89 students were recruited for the experiment.

Before entering the English class, all participants had to perform a language placement test measuring listening and reading comprehension. Thirty-five students were excluded from the study, because they couldn't complete their participation in the study. Consequently, 54 subjects have taken part actively in the study and will be analysed in the following. Two-thirds of the students in the sample are female, one third male. The most frequently studied fields are Economics (10 students), Agriculture, Biology and Social Sciences (5 students each). 87 percent of all students named German as their native language. Among the other native languages were Arabic (2) and Spanish (2). 13 percent of all students stated that they had learnt another language before the age of six.

7.3.2. Procedures

The experiment presents following structure:



7.3.2.1. Session I

In the first session (pre-treatment), participants performed a vocabulary test to determine whether they had previous knowledge of the target words, that were chosen for the experiment. Additionally, they were asked to fill in a questionnaire on their habits and preferences in dictionary use and their personal information.

Target word selection and preliminary vocabulary test

The preliminary vocabulary test comprised of 40 English words, with 25 distracters alongside the 15 target words. The 15 target words for the B2 level were substantives, adjectives, adverbs and verbs selected through a previous test conducted with 80 participants. In addition, a LexTale[99] test was administrated, in order to further asses the lexical competences of the participants. At the end of the first session, participants had to answer a questionnaire related to on their dictionary use habits and preferences.

7.3.2.2. Session II, III, IV

In the second session (experiment main session), participants were asked to read the short story *The Model Milionnaire* (1887) by Oscar Wilde. It was selected as reading material for the experiment. The readability, appreciation and the comprehension difficulty were pretested with another group of students the semester before, in order to check if the text could fit a B2 level. Four EFL teachers also classified the short story as a text suitable for the target level of students. Furthermore, an automatic Readability Checker[100] was conducted to proof the reading and grade level of the text.

Before the second session, students were randomly assigned to the following three groups:

- Treatment group 1 (paper): participants assigned to this group had to read the text and look at the definition of the target words marked in bold using the paper dictionary.
- Treatment group 2 (online): participants assigned to this group had to read the text and look at the definition of the target words marked using the online dictionary on their smartphone.
- Control group (control): participants assigned to this group had to read the text and infer from the context the meaning of the target words through the context without dictionary aid.

PONS bilingual (German-English/English-German) compact dictionary in book format and PONS bilingual dictionary online were used for groups 1 and 2 respectively.

The reading time was measured, but students did not have any time constraints.

[99] The LexTALE is a quick and practically feasible test of vocabulary knowledge for medium to highly proficient speakers of English as a second language. It consists of a simple un-speeded visual lexical decision task. In contrast to other vocabulary or proficiency tests, it has been designed to meet the needs of cognitive researchers. It is quick, easy to administer, and free, and yet it is a valid and standardized test of vocabulary knowledge. It has also been shown to give a fair indication of general English proficiency. See http://www.lextale.com/whatislextale.html (consulted 10/06/20).

[100] See: http://www.readabilityformulas.com/free-readability-formula-tests.php.

After the reading part, the following tests were administered to the students:

Table 1: Test typology

Test object	**Test typology**
1)Vocabulary acquisition	**a) Form test (5 items)** Participants had to choose the correct English spelling of a target word in the reading passage from one of four possible options. Of the four spellings displayed for a target word, one is the correct spelling, one contains an incorrect letter, one contains two interchanged letters, and one contains an incorrect letter and two interchanged letters. It is a receptive task. (Ex. A. percipt B. percept C. precipt D. precept E. I don't know) **b) Meaning test:** 1) Translation - Receptive meaning (5 items) Participants were requested to write down in German, a brief definition or a translation of the target word from the reading passage. 2) Sentences - Productive task (5 items) The participants had to write 5 sentences with the target word of the receptive meaning task.
2) Content recall	**c) Cloze test (5 items)** Participants were asked to fill-in the target words in the blank spaces of the original text. Beside the memory task, this also includes a productive task. The participants had to recall and write the spellings or forms of the target words. Ex.: Over his shoulders was _____a coarse brown cloak […]

3) Comprehension	**d) Content test (7 items)** The participants had to answer questions related to the content of the text. In this part, we tested how much information the participants could remember by having them focus on both the target words and passage content. The participants had to choose the best answer to each question from four options based on the information in the reading passage.

At the end of the second session the groups working with dictionaries had to answer some questions related to the experience of using the dictionary during the experiment and a questionnaire related to the "social prestige" of the medium (paper v. digital dictionary). The concept and the scale of "social prestige" was adapted from Salgaro et. al. (2018).

Dictionary's social value scale

Social value considers the evaluation of dictionaries in terms of:

1) Economic value: medium for money. This value captures dictionary as objects of the economic system. In particular, in this study is investigated the economic value attributed by users to the vocabulary support in paper and in digital format.

   Item:

   The dictionary you have just used exists in paper format and in a digital edition, but it is not freely available on the Internet. Both versions have the same price. Would you rather buy the paper version or the electronic version? (EV)

   - Papier version
   - Digital online version

2) Social prestige. This value represents symbolic capital[101] and the gain in prestige amongst dictionaries (paper vs. digital) in general.

   Items:

   - I would like to recommend this dictionary to my friends (SP1);

[101] Symbolic capital is said to refer to a: "degree of accumulated prestige, celebrity or honour and is founded on a dialectic of knowledge (connaissance) and recognition (reconnaissance)" (Bourdieu, 1993, p. 7).

- This dictionary is reliable (SP2);
- The dictionary you used has received an award from Stiftung Lesen as the best German dictionary of the year 2018. Do you agree with the jury's verdict? (SP3);
- Primary school children should not use this dictionary. They will quickly forget the word they looked up (SP4);
- You have used the dictionary in paper format/electronic format. Some publishers have different versions of the same dictionary in paper format and in digital format. Do you find information contained in a paper dictionary more reliable than that contained in a digital dictionary? (SP5).

Dictionary use experience

Furthermore, the questionnaire included the following questions on the experience with the online and paper dictionaries. The items were adapted from previous studies on the topic (Koyama and Takeuchi 2004; Alharbi 2016).

In the questionnaire participants were asked to rate the presented items on a five-point Likert scale, which was recoded to 1 'completely disagree' to 5 'completely agree'.

1) Self-evaluation in the learning process:

- I was able to remember the words I looked up (SE1 = F12);
- In my opinion, my knowledge of English becomes more extensive by using this dictionary (SE2 = F15).

2) User-friendliness:

- The explanation of the words is easy to understand (UF1 = F1);
- The dictionary contains much information at first glance (UF2 = F2);
- I am satisfied with the dictionary (UF3 = F5);
- I would like to continue working with this dictionary (UF4 = F6);
- I could quickly find the meaning of the word I was looking for (UF5 = F8);
- I could find other meanings of the word I was looking for (UF6 = F9);
- The dictionary is accessible to all (UF7 = F10);
- I enjoyed working with this dictionary (UF8 = F11);
- The dictionary was user-friendly (UF9 = F13);
- I want to use this dictionary again when I participate in the experiment (UF10 = F14);

- I was confused when I used this dictionary (UF11 = F16);
- I can use this dictionary anywhere and at anytime (UF12 = F18).

3) Ergonomics
   - Looking up the words did not strain my eyes (ER1 = F3);
   - I can look up a word at a time (ER2 = F4);
   - I did not have a stiff neck after using the dictionary (ER3 = F7).

One and two weeks after the main session, participants had to attend a delayed vocabulary test of the target words. It consisted of the same test performed by the subjects in the first session of the study.

7.4. Methods

To analyse whether there are statistical differences between the test performance of the three experimental groups in this study, we employ analysis of variance (ANOVA) and Tukey post-hoc test. If assumptions for ANOVA[102] are not met, Kruskal-Wallis test is used as non-parametric alternative.
Students' experience with dictionary use during the experiment are analysed using exploratory factor analysis to test whether the expected underlying scales (self-evaluation, user-friendliness and ergonomics) can be found in the data. The number of factors is determined by the Kaiser-Guttmann criterion (eigenvalue > 1.00). Factors with insufficient factor loading (< 0.5) are excluded from the analysis. Reliability of the factors is evaluated using Cronbach's alpha.

7.5. Results

7.5.1. Session I: LexTale and evaluation of random assignment

Following the analysis strategy of the LexTale, for each participant we created a score, where one point is given for each correctly identified word or non-word and zero points otherwise. Applying the weighting formula suggested by the authors, we got the LexTale score for each

[102] Before conducting ANOVA, we test its main assumptions, i.e. if there are outliers, if residuals are approximately normally distributed and if homogeneity of variance in the groups can be assumed.

participant, showing the percentage of correctly identified words weighted by number of words and non-words in the test. Table 2 shows the arithmetic mean and standard deviation of the scores. To assess whether the random assignment of students to the three experimental groups was successful we ex post sorted the students to their respective experimental groups.
The arithmetic mean which is similar in all groups and the results from an ANOVA for differences between the later assigned groups (non-significant) show that students' initial levels of vocabulary skills are quite similar, indicating that random group assignment was successful.

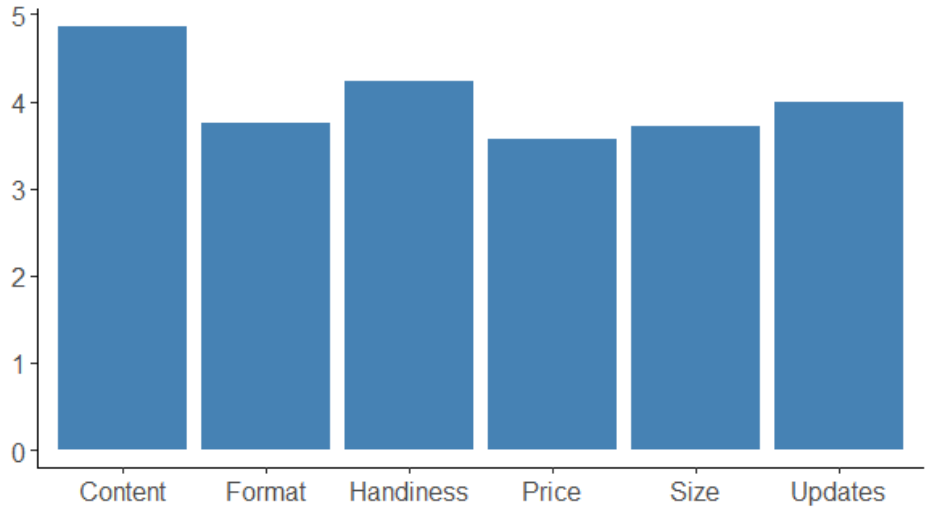
Table 2: LexTale score (arithmetic mean and standard deviation)

	M (SD)
Paper	62.6 (6.8)
Online	62.1 (7.5)
Control	59.2 (6.3)
Overall	61.7 (6.9)

7.5.1.1 Session I: Dictionary preferences and usage habits

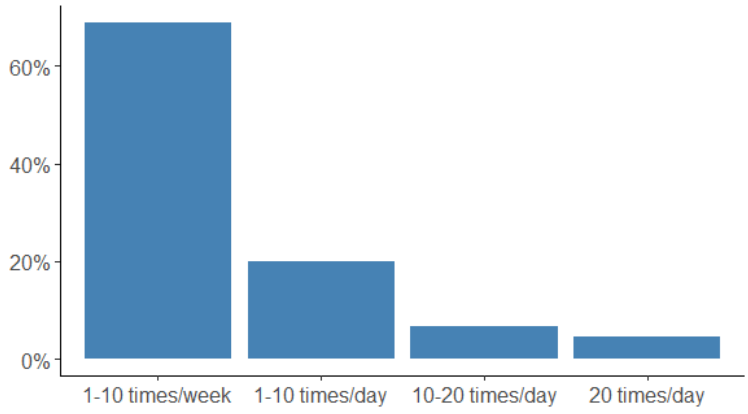
At the end of session I, students were asked about their preferences regarding dictionaries and how they usually made use of this medium.
Figure 1 shows the average ratings students gave on the question what main characteristics a dictionary should have in their view. On a scale from 1 'very irrelevant' to 5 'very relevant' students rated all characteristic as being quite relevant to them. Minor differences indicate that format, handiness and updates are slightly more relevant than content, size and price.

Figure 1: Ratings of several characteristics of a dictionary (arithmetic mean)



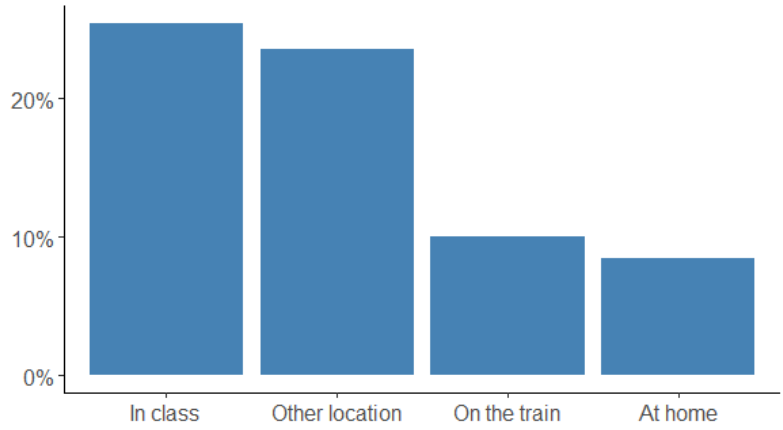
When asked about the specific dictionary they usually used, the top three students named were: Pons (35 percent of students), Leo.org (29 percent) and Google (18 percent).

Figure 2: Usage of dictionary per day/week (in percent)



About 70 percent of the students use their dictionaries 1 to 10 times per week, 20 percent 1 to 10 times per day and about 10 percent more often (10-20 and more times per day) (see Figure 2). In addition, students were also asked to indicate where they usually used a dictionary. They could distribute percentages up to 100 onto the four categories: in class, at home, on the train or in another location (which could be specified in a text answer).

Figure 3: Location of dictionary usage (in percent of 100 in total)



The main usage of dictionaries is in class, followed by "other location", which – according to the locations students entered here – was mainly in the library and in university in general (see. Figure 3). With regard to the direction of translation, students use their dictionaries for English to German 54 percent of the time and for German to English 46 percent of the time.

7.5.2. Session II: Text reading time

In session II students read the short story *The Model Milionnaire*. Although there was no time limit, time till completion of reading was taken. On average students from the control group were fastest in finishing reading (M = 22.0 min, SD = 5.8 min) which was to be expected, since they were not interrupted by the usage of a dictionary. The online group needed 24.3 minutes (SD = 9.3 min) on average to finish, whereas the paper group read the longest with 29.9 minutes (SD = 10.7 min). These descriptive results could indicate that among dictionary users, participants using the paper dictionary had to exert effort in finding target words than those using online dictionary. Typing a word in an online dictionary is generally easier than leafing through a paper dictionary. Maybe the online dictionary treatment helped to reduce extraneous cognitive load, that allowed the participants to have more time to focus on text reading and comprehension (Liu & Lin, 2011; Sweller, 2010).

7.5.2.1. Session II: Vocabulary test

To analyse whether students' performance in vocabulary recognition, memorization and comprehension after the short story reading task differed according to the dictionary they used

during the exercise, five tests (form, translation, sentences, cloze, content) were administered (also see Table 1). Table 3 shows the arithmetic means and standard deviations (in brackets) of the percentage of correct answers per test.

Table 3: Percentage of correctly answered items on several vocabulary tests after reading exercise (arithmetic mean and standard deviation)

	Form	Translation	Sentence	Cloze	Content
	M (SD)	M (SD)	M (SD)	M (SD)	M (SD)
Paper	75.6 (28.5)	48.9 (29.3)	48.9 (29.3)	60.0 (29.9)	59.5 (30.6)
Online	66.7 (20.6)	52.2 (27.6)	48.9 (31.6)	51.1 (29.3)	59.4 (24.2)
Control	48.9 (28.5)	31.1 (22.6)	33.3 (20.0)	57.8 (32.2)	54.0 (17.1)
Overall	66.7 (25.0)	46.7 (28.0)	45.8 (28.8)	56.0 (29.7)	58.3 (25.4)

Form

In the task participants had to remember the form of words, their correct spelling. Students from the paper group in this study performed best, solving 76 percent of the items correctly. Students from the online group were correct in 67 percent of instances and students from control group only solved 49 percent of the items correctly (see Table 3). The standard deviation of the online group is considerably lower than in the other groups. One interpretation for this could be that using an online dictionary results in less differences in performance between students, i.e. making the group more homogenous. ANOVA and Tukey post-hoc test show a significant difference ($F(2, 42) = 5.17$, $p < 0.01$) which is due to differences between the group who used a paper dictionary and the control group ($p < .01$).

Translation

The translation task was done best by the online group in this study, that was correct in 52 percent of instances. The paper group was almost as good with a score of 49 percent correctly translated items. Far behind is the control group, that only translated 31 percent of the words correctly trying to infer the meaning of the words from the context. The differences are statistically not significant.

Sentence

Using the newly learned words in a sentence was equally challenging for the paper and online groups. Both inserted the correct words in 49 percent of all instances. The control group scored considerably lower, inserting only 33 percent of the words correctly. The ANOVA on this exercise shows no significant differences.

Cloze

In the task several words were removed from the text and subjects were asked to fill in the missing content in order to test its memorization. In the test minor differences in the arithmetic means are found. The paper group performed best, followed by the control group. Students in the online group only solved a little more than 50 percent of the test correctly. The ANOVA shows no significant differences between the groups.

Content

In this task participants were tested on the content of the test they had read. The results reveal only minor differences in the means of correctly answered items. According to these students from the paper and online groups are a little better than those from the control group. Differences are statistically not significant.

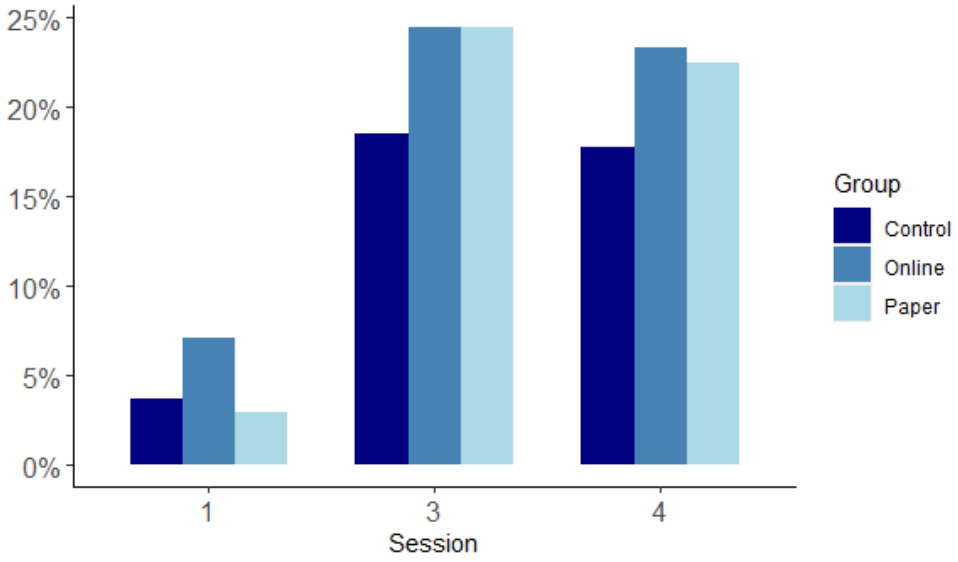
In a bivariate analysis, we tested, whether the test results for experiment session II were related to frequency of dictionary use (see 7.4.1.1.) We found positive relationships (*: $p < 0.05$) between the frequency of use and students' performances in the tasks: Translation: 0.30*, Cloze: 0.24, Form: 0.39, Sentence: 0.31*, Content: 0.31*.[103.] These indicate that higher test scores are related to a more frequent use of dictionaries. At least for our subjects, more than the medium (online vs. paper dictionary), the frequency of dictionary use and its practice seems to play an important role in student's performances.

7.5.3. Sessions I, III and IV: Target words retention after one and two weeks from the main session

One and two weeks after the experiment main sessions, student's retention of the target words was measured using the test from session I (see above, table 1) This was done to see if there are long-term effects of the use of paper and online dictionaries.

[103] Cramers's V for the five tests in experiment main session II.

Figure 4: Percentage of correctly translated target words for the groups Paper (P), Online (O) and Control (C)



In session I, before the actual experiment, students in the sample translated 5 percent of the target words correctly[104]. The group of students that used an online dictionary translated 7 percent of the items correctly, the other two groups were right in 3 (Paper) and 4 (Control) percent. One week after the main experiment students in the paper and online group performed considerably better (Online: 25%; Paper: 24%) than students in the control group (19%). The results after two weeks were similar: students in the online and paper group translated 23 percent of the items correctly, those from the control group 18 percent.

To analyse whether the differences are significant we performed a two-way repeated measures ANOVA. Apart from the main effects, we were interested to see whether the groups' performance changes over time and therefore introduced an interaction effect for group and time. For time we find a significant main effect ($F(1,81) = 60.1$, $p < .001$). According to pairwise comparisons this effect is due to a significant difference in performance from the first session to the third session ($p < .001$) and fourth session ($p < .001$), indicating that students' performance increased significantly after the experiment compared to before. The main effect for group showed no significant differences, neither did the interaction term. This shows that there are no differences in vocabulary retention according to the use of different types of dictionaries (paper or online) or no dictionary at all (control group).

[104] There were no groups at time 1. They were assigned ex post in order to have a baseline for each group to compare their results in the later sessions to.

7.5.4. Social value and dictionary use experience

In the second session all participants that had used a dictionary during the experiment were asked to rate their experience regarding the following aspects:

Economic value

The economic value (EV) of online dictionaries was perceived to be higher by the participants. In the questionnaire they were asked - dependently of the dictionary they had used – to state, which one they would rather buy if online and paper dictionaries cost the same[105]. 77 percent of participants would buy the online, 23 percent the paper dictionary. Only minor differences between the two groups analyzed here were found: of those who used the online dictionary in the experiment 75 percent and of those who used the paper dictionary 80 percent would prefer to buy the online version. The difference is not significant.

Social Prestige

To evaluate social prestige student's associate with the dictionaries, five rating items were included in the questionnaire (see SP1-SP5) of which three can be used for analyses[106]. The items were recoded to a scale from 1 'I disagree very much' to 5 'I agree very much'.

Table 4: Aspect of social prestige of dictionaries by group (arithmetic mean, standard deviation)

	Recommendation	Reliability	Prize-worthiness
	M (SD)	M (SD)	M (SD)
Paper	3.3 (0.6)	4.1 (0.8)	3.5 (0.8)
Online	3.2 (1.1)	4.4 (0.8)	3.9 (0.8)
Overall	3.3 (0.9)	4.2 (0.8)	3.7 (0.8)

Overall and in the two groups students would not necessarily recommend any of the two dictionaries to their friends. But they agree that both dictionaries are reliable, the online

[105] Question: "The dictionary you have just used exists in paper format and in a digital edition, but it is not freely available on the Internet. Both versions have the same price. Would you rather buy the paper version or the electronic version?"

[106] Two items (SP4, SP5) were excluded from the analyses due to ambiguous interpretability of the items that was later found.

dictionary even more so than the paper dictionary. Both groups think that their dictionary was worthy of the prize was described it had won.[107] Online users agreed more than paper dictionary users. All differences are only found in this sample and are statistically not significant.

User experience

To assess students' experience with the dictionaries an exploratory factor analysis was carried out. This way, we can determine whether the items that were included in the questionnaire to measure the concepts of self-evaluation, user-friendliness and ergonomics can be aggregated to the corresponding scales (see section 7.3.2.2.)[108]. The analysis resulted in the following factors: Factor 1 (Cronbach's $\alpha = 0.88$) subsumes items that were intended to measure user-friendliness of the online resp. paper dictionaries (UF2, UF3, UF4, UF5, UF8, UF9, UF10). Factor 2 ($\alpha = 0.75$) consists of the two items (SE1, SE2) that were used to measure the participants' self-evaluation capabilities in the learning process. The items allocated to Factor 3 ($\alpha = 0.61$) were partly thought to measure ergonomic aspects (ER3) of dictionary use and user-friendliness (UF7, UF12). In this combination we interpret them as "Accessibility".

Based on the results from the factor analysis additive scales were calculated. They can be interpreted on a scale 1 'I disagree very much' to 5 'I agree very much'. Table 5 shows the arithmetic means for the factors by groups and whether there are statistically significant differences between the groups.

Table 5: User-friendliness, use for self-evaluation and accessibility of dictionaries by group (arithmetic mean, standard deviation)

	User-friendliness	Self-evaluation	Accessibility
	M (SD)	M (SD)	M (SD)
Paper	2.5 (0.7) a	3.0 (0.9)	3.2 (0.9)
Online	2.0 (0.9) a	3.1 (0.7)	3.2 (1.3)
Overall	2.3 (0.8)	3.0 (0.8)	3.2 (1.1)

a = significant difference (Kruskal-Wallis test; $p < 0.05$)

[107] Wording of the item "The dictionary you used has received an award from Stiftung Lesen as the best German dictionary of the year 2018. Do you agree with the jury's verdict?".

[108] A three-factor solution was selected (according to Kaiser-Guttmann criterion); factors were extracted with varimax rotation; five items (UF1, ER1, UF6, ER2) were excluded due to insufficient factor loadings (> 0.5); one item (UF11) was included before the analysis due to ambiguous interpretability of the item.

Overall participants show a tendency to rather not agree with the user-friendliness of both types of dictionaries. In comparison of both groups subjects rated the user-friendliness of paper dictionaries higher than that of online dictionaries. The difference is statistically significant on the 5%-level. The use of both dictionaries for self-evaluation is rated neutrally by both groups, with almost no difference between the groups. The same holds for the Factor 'Accessibility'.

7.6. Discussion and conclusion

This study aimed to investigate students' dictionary-using habits and behaviours with a particular focus on vocabulary acquisition while reading of long literary text in a foreign language (English).

The experiment results showed that there was a significant effect of using a paper dictionary in facilitating vocabulary learning. In particular, there was a significant short-term effect in the task related to the spelling of unknow words (form task) immediately after the reading session. Participants using paper dictionary perform significantly better in the test compared to the control group. No statistically significant difference was found between paper and online users. Our results confirm those of Koyama and Taguchi (2003) who found that there was no significant difference for the retention of word forms between typing the spellings of words in an electronic dictionary versus looking them up in a printed dictionary. We couldn't find any significant effects of the medium on meanings of unknown words (translation and sentence production tasks), on memory (cloze task) and on comprehension of the reading text (content task). In the long-term, we found no statistical evidence for an advantage of using a dictionary, online or paper, in vocabulary retention. Even though, the experiment seems to have worked well as students' performance in vocabulary retention was significantly higher compared to baseline one and two weeks after the experiment.

According to our results paper dictionaries are perceived to be significantly more user-friendly than online dictionaries. Contrarily to Salgaro et al. we could not register any significant effect of medium in subjects' evaluation of social and of economic value of the two kinds of dictionaries. These results might be explained by the pragmatic aspect of learning, since a language student, unlike a passionate reader, is more focused on achieving goals and successes in his/her learning process and often the way and support (in the case of paper and digital dictionaries) to reach the objectives is not that crucial. As pointed out above, our subjects appreciate the qualities of the paper dictionary, in terms of user-friendliness, but the learning purpose almost minimizes the value of the medium by bringing out the pragmatic aspect of the

learning process. The study is limited in the sample size (54 participants) and in the experimental setting (one university), which is due to the fact that our study was a pilot study on the analysis of effects of the type of dictionary on vocabulary acquisition in literary reading. Despite its limitations, the empirical evidence reported in this study present an overview and can give insights for educators in general and language teachers in particular who need to teach students at each level how to utilize digital sources in ways that optimize learning given a specific topic, purpose, and environment.

Bibliography

Ackerman, R. & M. Goldsmith, 'Metacognitive regulation of text learning: On screen versus on paper', *Journal Of Experimental Psychology: Applied*, 17(1) (2011), pp. 18-32.

Ackerman, R., & T. Lauterman, 'Taking reading comprehension exams on screen or on paper? A metacognitive analysis of learning texts under time pressure', *Computers in Human Behavior*, 28(5) (2012), pp. 1816–1828.

Alharbi, M. A., 'Using different types of dictionaries for improving EFL reading comprehension and vocabulary learning', *JALT CALL Journal*, 12(2) (2016), pp. 123-149.

Bourdieu, P., *Distinction: A Social critique of the judgement of taste*. London: Routledge & Kegan Paul, 1984.

Bourdieu, P. *The field of cultural production. Cambridge*, Polity Press, 1993.

Chen, Y., 'Dictionary use and EFL learning: A contrastive study of pocket electronic dictionaries and paper dictionaries', *International Journal of Lexicography*, 23(3) (2010), pp. 275-306.

Chun, D. M. & J. L., Plass, 'Effects of multimedia annotations on vocabulary acquisition', *The Modern Language Journal*, 80(2) (1996), pp. 183-198.

Dziemianko, A., 'Paper or electronic? The role of dictionary form in language reception, production and the retention of meaning and collocations', *International Journal of Lexicography*, 23(3) (2010), pp. 257-27.

Knight, S., ‘Dictionary use while reading: The effects on comprehension and vocabulary acquisition for students of different verbal abilities’, *The Modern Language Journal*, 78 (1994), pp. 285-298.

Kobayashi, C., ‘The use of pocket electronic and printed dictionaries: A mixed-method study’. In Bradford-Watts, K., Muller, T. and Swanson, M. (eds.). *JALT 2007 Conference Proceedings* (Tokyo: JALT. 2008), pp. 769-783.

Komura, Y., Shitara-Matsuo, Y., Ishii, Y., Uchida, S., Kawamura, A., & T. Kanazashi, ‘An analysis of the Oxford advanced learner’s dictionary of current English, seventh edition, with special reference to the CD-ROM’, *Lexicon*, 36 (2006), pp. 55-146.

Koyama, T., & O. Takeuchi, ‘Comparing electronic and printed dictionaries: How the difference affected EFL learning’, *JACET Bulletin*, 38 (2004), pp. 33-46.

Lan, L., ‘The growing prosperity of online dictionaries’, *English Today*, 21(3) (2005), pp. 16-21.

Laufer, B. & M. Hill, ‘What lexical information do L2 learners select in a CALL Dictionary and how does it affect word retention?’, *Language Learning and Technology*, 3/2 (2000), pp. 58-76.

Laufer, B. & J. Hulstijn, ‘Incidental vocabulary acquisition in a second language: the construct of task-induced involvement’, *Applied Linguistics*, 22(1) (2001), pp. 1-26.

Lewis, M., *The lexical approach: The state of ELT and a way forward*. Hove, England: Language Teaching Publication, 1993.

Li-Ling, C. & L. Gi-Zen, ‘Effects of printed, pocket electronic, and online dictionaries on high school students’ English vocabulary retention’, *The Asia-Pacific Education Researcher*, (2013), pp. 22-61.

Liu, T.-C. & P.-H Lin, ‘What comes with technological convenience? Exploring the behaviors and performances of learning with computer-mediated dictionaries’, *Computers in Human Behavior*, 27(1) (2011), pp. 373-383.

Mangen, A., ‘The digitisation of narrative reading – theoretical considerations empirical evidence in the unbound book’. In J. Kircz, & A. van der Weel (Eds.), *The unbound book*. Amsterdam: Amsterdam University Press (2013), pp. 91-106.

Mangen, A., Walgermo, B. R., & K. Brønnick, ‘Reading linear texts on paper versus computer screen: Effects on reading comprehension’, *International Journal of Educational Research*, 58 (2013), pp. 61-68.

Salgaro, M., Sorrentino P., Lauer G., Lüdtke J.& A. M. Jacobs, ‘How to measure the social prestige of a Nobel Prize in literature? Development of a scale assessing the literary value of a text’. In *TXT*, N°5, The Book Issue. Academic Press Leiden and Amsterdam University Press (2018), pp. 138-148.

Schmidt, R., ‘The role of consciousness in second language learning’, *Applied Linguistics* 11/1 (1990), pp. 129-158.

Schmitt, N. & McCarthy, M., *Vocabulary: Description, Acquisition and Pedagogy*. Cambridge: Cambridge University Press, 1997.

Sweller, J., ‘Element interactivity and intrinsic, extraneous, and germane cognitive load’, *Educational Psychology Review*, 22 (2010), pp. 123-138.

8. Discussion

Digital devices such as smartphones computers, laptops, tablets are almost omnipresent in our everyday life. In many occasions, they have replaced paper-based materials for reading, both in didactic as well as in leisure contexts. The studies reported in this thesis bring out the complexity of the reading phenomenon and the need for an in-depth analysis of its facets. The medium represents only one of them. When we talk about reading, we need to consider following aspects:

- the text content: long or short, complex or simple;
- the reading purpose: pleasure or study, skim for the main ideas or scan for deep comprehension and critical reflection;
- the context: continuous or intermittent, with or without time limit;
- the typology of reader: neophyte or expert, enthusiastic or reticent.

A couple of attempts was made, to integrate these major aspects of reading, specifically to inform research on digital reading (Mangen & van der Weel 2016; Singer & Alexander 2017). The contributions presented in the recent anthology "Materiality of reading" (2020) try to explore this complexity. The editors Theresa Schilhab and Sue Walker bring together different disciplinary perspectives such as embodied reading, neurobiology, typography and design in order to explore how the materiality of text might influence readers' involvement with the paper or the digital book. In their introduction, Theresa Schilhab and Sue Walker describe "materiality of reading" as an "interaction between a person and an object where the person uses different senses to know and understand the object and the object is more or less considered manifestation of a content" [109]. Authors state that "materiality can also involve the comfort experienced while reading, the space (where we read) and the act of reading (how we read)".[110] The experiments presented in this dissertation approached only a few of the above-mentioned aspects and they can be included in a much larger and more articulated researches' spectrum investigating the shift from paper-based reading to digital reading. Over the last decades, particular attention was paid to the effects of screens on memory, comprehension reading and on the reading experience overall. The findings are often diverging, some studies reported no differences between paper and screen reading in term of comprehension (Hermena et al., 2017;

[109] T. Schilhab and S. Walker, *The materiality of reading,* Aarhus University Press, 2020, p 1.

[110] *Ibidem.*

Porion et al., 2016; Margolin et al., 2013; Rockinson-Szapkiw et al., 2013), whereas others (Aydemir et al., 2013) found positive effects of screen on reading comprehension. However, in further studies (Stole et al., 2020, Halamish & Elbaz, 2019; Golan et al. 2018; Lenhard et al., 2017; Singer & Alexander, 2017 Mangen et al., 2013), participants tested on paper reading got better results than their digital counterpart.

There are different reasons explaining the advantages of paper reading: it might be related to the device and the navigation (Mangen et al. 2013), to the visual fatigue caused by the digital support (Wästlund et al. 2005; Mangen et al. 2013). A possible hypothesis for explaining the advantage of printed texts is the shallowing hypothesis (Annisette & Lafreniere, 2017). According to this hypothesis certain types of social media support rapid, shallow thought and people using them are process digital texts more shallowly or superficially. This idea is supported by findings showing that readers process digital texts faster than printed texts (Singer Trakhman et al., 2018, 2019). The rise of meta-analyses (Delgado et al., 2018; Kong et al., 2018; Clinton, 2019) brought more insights on the topic and suggested the advantages of paper reading across broad age and education level sample population. Delgado et al.'s meta-analyses, with 54 studies (and in total 171,055 participants) conducted between 2000 and 2017, is one of the most extensive investigation. Interestingly, Delgado et al. found screen inferiority in expository but not narrative texts and those effects were significant only among the experiment in which subjects were tested under time pressure. The same results are reported in the later meta-analyses conducted by Virginia Clinton in 2019. "The fact that the on-screen inferiority particularly emerges in expository texts and that it increases under time constraints suggests that such effect arises in cognitively demanding tasks. Although literary texts can be highly complex and difficult to fully understand, comprehension of expository texts (vs. narrative) is generally considered to demand increased cognitive efforts, as they present academic knowledge usually by means of a large number of ideas, infrequent vocabulary and complex text structures" (Delgado & Salmerón, 2020). The main experiments on paper-based and screen reading test generally university students and that could be a limitation in the generalization of the outcome. Factors such as social economic status or level of reading skills as well as reading experiences over lifetime are seldomly part of the experimental design. Reading is always embedded in a larger set of habits, which are overlook in a lot of the current experiments. In the study presented in chapter V of this dissertation, I tried to address this research to a sample of subjects more varied by age and level of education.

8.1. Summary of major findings or results

A vast amount of studies has looked at the issues related to reading from digital versus paper sources paying close attention to the reading performance, reading strategies, vocabulary development, reading comprehension, engagement and motivation. The aim of this dissertation was not to not only to compare screen vs. print but improve the understanding of the embedded reading in complex social universes, where digital/non-digital is only one, but minor factor. The widespread use of digital resources has brought about significant changes in reading practice and behaviour as people spend more time reading online. The same evaluation of the reading medium by the reader might have changed. In the first part of my thesis, I focused on reading as multi-faceted and social phenomenon, in particular the cases "social prestige" and "age" were investigated. In the first experiment related to the social prestige, I wanted to examine whether the readers' attributions of literary value might be affected by the reading support, a questionnaire to measure the evaluation of the literary quality was developed. Experiment's results reported an interaction between the medium and the text type in the subscale social value, and an effect of the medium in the evaluation of the economic value. Those findings support the hypothesis that the context, i.e. the positive attitudes of readers towards a certain reading support, plays a determinant role in the attribution of literary value. In the second experiment the factor "age" was investigated. In particular I tried to test empirically the reliability of the metaphor "digital natives/digital immigrants" introduced in 2001 by Mark Prensky. I looked at the reading habits and inclination of young and elderly people in relation to literary reading on paper vs. on screen. The results reported two kind of approach towards literary reading on screen, represented by readers who are familiar with digital device (because they have been using it for longer than three years) and readers who are not used with it (less than two years' experience). In accordance with previous findings (Chen et al. 2014; Margolin et al. 2013; Noyes & Garland, 2003), the preference and the familiarity with the digital medium are the discriminating factors in participants' performances in the study and not their age. According to the findings, the usefulness of the labels "digital natives/digital immigrants" to depict particular generations of young people has to be questioned.

The second part of this thesis moves to the educational context and explore the literary reading in a foreign language (English) and the dictionary use (paper vs digital) in order to learn new vocabulary. The study investigated students' dictionary-using habits and behaviours with a particular attention at vocabulary acquisition while reading of long literary text in a foreign language (English). The results did not show any influence of the medium (paper vs online

dictionary) on students' vocabulary learning process. Significant results were registered only in the use vs not use of dictionary at all. The experiment revealed a strong pragmatic aspect of learning process, since students don't seem to attribute any particular economic value or social prestige to one dictionary rather than another. Significant results were reported in terms of user friendliness in favour of the paper dictionary.

8.2. Limitations of the studies

The experiments reported in this thesis present some methodological limitations that have to be noted:

Sample size and selection

Both the studies were limited in their samples size. The research reported in the first part of the work comparing the use of paper vs. digital reading support contained a sample of 59 subjects while the experiment comparing the use of paper and online dictionary presented in the second part tested 54 participants. Furthermore, the samples were all collected in Germany (Low Saxony and Berlin), so that the geographic tested area is fairly restricted. Those samples were effective for conducting pilot studies, but limit the generalizations that can be made, since they cannot ensure a representative distribution of the population whom results will be generalized or transferred.

Lack of previous research studies on the topic

Researches exploring digital and paper reading process and outcomes are numerous, but studies investigating the social prestige of the reading support are still missing. The experiment reported in the first section of this work wanted to fill in this gap and was designed by the operationalization of a crucial concept in literary studies: the literary evaluation. Starting from a theoretical model created by Renate von Heydebrand and Simone Winko to evaluate literature in a pluralistic way, a questionnaire was designed to test whether the genre of a literary text (prose vs. poetry) and the reading medium through which it is presented (an antique book vs. an e-reader) might influence the attribution of literary quality among readers. The lack of prior research on the specific topic represents an important limitation since it is missing a direct basis of literature review that might help laying a foundation for understanding the research problem investigated in this work.

The experiment on the use of dictionary did not face this kind of issue, since it was mainly based on previous studies.

Texts stimuli used to collect the data

The short stories and the poems selected for the first experiment seems to have influenced the subjects in their literary evaluation of the text. The reason might be related firstly to the literary genre. Subjects seem overall to like poetry but they did not like the two poems proposed in the study. In other research (Kraxenberger & Menninghaus, 2017) results showed the higher affinity to poetry in general is, the higher the positive evaluations tend to be, independent of a poem's content. The authors chosen might carry a different social prestige since the one is a Nobel-prize winner, Ernst Hemingway, the other is almost a today unknown romantic writer, Wilhelm Hauff. Furthermore, the factor of the time distance between writer and readers has to be considered. The authors belong to different historic period (Hemingway 1899-1961; Hauff 1802-1827) and the time distance between writers and readers might have affected subjects' evaluation.

In the second experiment, the text did not play a determinant role in the study, since the focus was on the dictionary use. Furthermore, to avoid problem related to text comprehension, difficulty and appreciation, I carried out a pretest on the readability and appreciation of the selected short novel used for the study. However, further limitations have to be considered in this study. First, the typology of the dictionary used was restricted to PONS online and paper version. Moreover, among the digital dictionaries (pocket, type-in, pop -up dictionary) only the type in dictionary was subject of investigation. Second, the study did not control the content of the headwords in dictionaries. Third, the target words used in this study were mainly two-syllable substantives or adjectives of five to seven letters. In future experiments words of different categories should be investigated. Furthermore, the level of difficulty of the target words might have played an important role in the study. Despite the fact that participants in different condition had the same language level and worked on the same words, some target items might have been easier to acquire than others by subjects working in different conditions. That was not controlled in the experiment. Last but not least, for this study, the data collected were examined immediately after the main session and after one and two weeks. Further studies should investigate a longer-term retention of new vocabulary.

8.3. Conclusion and implications for future research

The studies reported in this dissertation represent an attempt to contribute to a more fact-based debate on future direction in research on digital reading and learning. In line with the "Stavanger Declaration Concerning the Future of Reading" published in 2019 by European E-READ research network[111], the experiments' results presented in the work reinforce previous results stating that the digital technologies used for reading are "not neutral"[112]. The experiments reported in this work contribute to and expand the current debate analogue vs. digital reading as they investigate the complex dynamic of paper and e-reading for two different purposes: pleasure and learning. For the pleasure purpose, the prestige played by the reading support in our society and its implication in the literary and economic evaluation were newly introduced as subject of investigation in the field. In this context, the factor age on the readers' performance by using different type of support (e-reader and paper book) was studied too. In the same way, for the learning purpose, together with vocabulary acquisition and the dictionary use, the economic value and social prestige of online vs. paper dictionary were newly tested. Interestingly, according to our results the economic value of the reading support was higher for the paper format only in the context of reading for pleasure. These findings might be related to the goal of the study, i.e., the learning purpose.

At least for researches reported in this work, the reading condition (paper vs. digital) doesn't seem to be determinant for the reading outcome and performance, either in the case of memorization of words, and understanding of the text content in the context of reading for pleasure, or in the acquisition of new vocabulary for didactic purpose. More than focusing on the gap between paper and digital worlds, future researches should look at familiarity with medium and with act of reading in itself, since one of the studies reported in dissertation unveiled the experimental lack hidden behind the captivating metaphor "digital natives/ digital immigrants". The limitations reported above can serve as an important opportunity to describe the need for further research. Similar case study should be carried out in future works including larger samples from a wider geographic area. In the case of the experiments reported in the first part of this dissertation, the selection of the text stimuli has proved to be crucial in the subjects' evaluation, for this reason it would be useful to conduct a pretest in order to choose the reading materials to be used.

---

[111] See https://ereadcost.eu/wp-content/uploads/2019/01/StavangerDeclarationPressRelease.pdf accessed 22/09/2020.

[112] *Ibid*.

In regard to the dictionary experiment, future researches should consider more dictionary types. Furthermore, it should be included in the investigation if and how words of different part of speech might influence the learning of word forms, word meaning and text comprehension. Since the study reported in this dissertation tested only B2 English university students, future works could include different proficiency levels and different ages of EFL learners. Furthermore, the retention of the new encountered words should be tested in a longer-term effect over two weeks.

Many researches have been carried out to investigate the impacts and effects of reading on different media platforms, however many questions concerning the future of reading are still unanswered or need further investigations:

- To what extent are current findings of screen inferiority related to experience and expertise (with medium, and with reading)?
- How to improve deep engagement with (complex; long) texts on screens?
- What are the cognitive implications related to the screen disadvantage by text reading?

The utility of digital technologies represents a subject of great interest and concern in the educational field since their use becomes more and more pervasive. Researchers from different disciplines warn about their potential harming impact on human cognition, with especial emphasis on students' in-depth information processing and sustained attention capacity (e.g.; Salmeron & Delgado, 2019; Wolf, 2018, Baron, 2015). Furthermore, E-READ research results show clearly that "paper remains the preferred reading medium for longer single texts, especially when reading for deeper comprehension and retention."[113] Recently, some studies have exanimated the data from the Program for International Student Assessment (PISA), their results reported that the change from print to computerized tests in PISA 2015 had a negative impact on students' PISA test scores in Germany, Sweden and Ireland (Jerrim et al., 2018; Robitzsch et al. 2020). Even if in many cases the use of technologies has shown to have any or even negative effects on the improvements of digital reading competence and learning, it is necessary to know those effects to be able to decide how to use digital technology into our private reading sphere and in the didactic context. As reported in the Stavanger Declaration, "digital text offers excellent opportunities to tailor text presentation to an individual's preferences and needs. Benefits for comprehension and motivation have been demonstrated where the digital reading environment was carefully designed with the reader in mind; [...] Our

[113] See https://ereadcost.eu/wp-content/uploads/2019/01/StavangerDeclarationPressRelease.pdf accessed 22/09/2020.

embodied cognition (i.e., that how and what we learn, know, and can do depends on features of the entire physical body) may contribute to differences between reading on paper and on screen in terms of comprehension and retention. This factor is underestimated by readers, educators and even researchers".[114] In the digital age, it would be unrealistic to propose to go back to the print, especially in the time we are living in, when the spread of the global pandemic caused by COVID-19 has increased expansively the digital life and the online education (Netedu 2020, in Schilhab/Walker), but it is necessary to understand the medium effects on the reading and learning processes, in order to try at least to reduce its negative impacts. The introduction of technology for pleasure reading and learning should go together with practice in order to benefit of its advantages and instruct readers and learners how to act successfully in the digital world.
The metacognitive skills, the ability to choose between media very consciously depending on the purpose plays a crucial role. As claimed by Lauer (2020), "it's not digital or analogue that makes the difference, but our ability to consciously switch between different possibilities of reading"[115]. In the educational context teachers and learners should be conscious of the limits and the risks related to the use of digital technologies (for example problems with memorization and distraction), but it should be supported the development of meta-cognitive skills so that learners can better regulate their learning process in the digital context and teach digital reading strategy. In a secondary school, for example, Salmerón and Llorens (2019), have adopted a video modelling to teach self-regulated information search on Wikipedia. Firstly, scholars were instructed on the self-regulation strategies they could use, after that, in the test phase they went from doing a scan and superficial reading to a carful and more detailed reading.
Digital technology is double-edged sword and its relation with reading and learning is not free of risk, but educators can support and improve their use, boost their potentialities and inhibit the harm they can cause.

[114] *Ibid.*

[115] G. Lauer, *Lesen in dem Digitalen Zeitalter*, Darmstadt, 2020, p.22. My translation, original: Nicht digital oder analog machen den Unterschied, sondern unsere zu erlernende Fähigkeit, bewusst zwischen verschiedenen Möglichkeiten des Lesens wechseln zu können.

Bibliography

Ackerman, R., & Goldsmith, M. (2011). Metacognitive regulation of text learning: On screen versus on paper. *Journal of Experimental Psychology: Applied, 17,* 18–32.

Ackerman, R., & Lauterman, T. (2012). Taking reading comprehension exams on screen or on paper? A metacognitive analysis of learning texts under time pressure. *Computers in Human Behavior, 28(5),* 1816–1828.

Annisette, L.E., & Lafreniere, K. (2017). Social media, texting, and personality: A test of the shallowing hypothesis. *Personality and Individual Differences, 115,* 154–158.

Aydemir, Z., Öztürk, E., & Horzum, M. B. (2013). The effect of reading from screen on the 5th grade elementary students' level of reading comprehension on informative and narrative type of texts. *Educational Sciences: Theory and Practice, 13(4),* 2272–2276.

Backes, B., & Cowan, J. (2018). Is the pen mightier than the keyboard? The effect of online testing on measured student achievement. *Economics of Education Review, 68,* 89–103.

Baron, N. S. (2015). *Words onscreen: The fate of reading in a digital world*. USA: Oxford: Oxford University Press.

Barzillai, M., & Thomson, J. M. (2018). Children learning to read in a digital world. *First Monday, 23(10),* 1–10.

Chen, G., Cheng, W., Chang, T.-W., Zheng, X., & Huang, R. (2014). A comparison of reading comprehension across paper, computer screen, and tablets: Does tablet familiarity matter? *Journal of Computers and Education, 1,* 213–225.

Chen, C.-M., & Lin, Y.-J. (2016). Effects of different text display types on reading comprehension, sustained attention and cognitive load in mobile reading contexts. *Interactive Learning Environments, 24(3),* 553–571.

Clinton, V. (2019). Reading from paper compared to screens: A systematic review and meta-analysis. Journal of Research in Reading, *42(2)*, 288–325.

Delgado, P., & Salmerón, L. (2020). The inattentive on-screen reading: Reading medium affects attention and reading comprehension under time pressure. *Learning and Instruction, 71,* 101396–101396.

Delgado, P., Vargas, C., Ackerman, R., & Salmerón, L. (2018). Don't throw away your printed books: A meta-analysis on the effects of reading media on reading comprehension. *Educational Research Review, 25,* 23–38.

Golan, D.D., Barzillai, M., Katzir, T. (2018). The effect of presentation mode on children's reading preferences, performance, and self-evaluations. *Computers & Education, 126,* 346–358.

Halamish, V., & Elbaz, E. (2019). Children's reading comprehension and metacomprehension on screen versus on paper. *Computers & Education, 145.*

Hermena, E. W., Sheen, M., AlJassmi, M., AlFalasi, K., AlMatroushi, M., & Jordan, T. R. (2017). Reading rate and comprehension for text presented on tablet and paper: Evidence from Arabic. *Frontiers in Psychology, 8,* 257.

Jerrim, J., Micklewright, J., Heine, J. H., Salzer, C., & McKeown, C. (2018). PISA 2015: How big is the 'mode effect' and what has been done about it? *Oxford Review of Education, 44,* 476–493.

Kong, Y., Seo, Y. S., & Zhai, L. (2018). Comparison of reading performance on screen and on paper: A meta-analysis. *Computers & Education, 123,* 138–149.

Kraxenberger, M., & Menninghaus, W. (2017). Affinity for poetry and aesthetic appreciation of joyful and sad poems. Frontiers in Psychology, *7*, 2051.

Lauer, G. (2020). *Lesen im digitalen Zeitalter*. Darmstadt.

Lenhard, W., Schroeders, U., & Lenhard, A. (2017). Equivalence of screen versus print reading comprehension depends on task complexity and proficiency. *Discourse Processes, 54(5–6),* 427–445.

Mangen, A., Walgermo, B. R., Brønnick, K. (2013). Reading linear texts on paper vs. computer screens: Effects on reading comprehension. *International Journal of Educational Research, 58,* 61–68.

Margolin, S. J., Driscoll, C., Toland, M. J., & Kegler, J. L. (2013). E-readers, computer screens, or paper: Does reading comprehension change across media platforms? *Applied Cognitive Psychology, 27(4),* 512–519.

Noyes, J. M., & Garland, K. J. (2003). VDT versus paper-based text: Reply to Mayes, Sims and Koonce. *International Journal of Industrial Ergonomics, 31(6),* 411–423.

Porion, A., Aparicio, X., Megalakaki, O., Robert, A., & Baccino, T. (2016). The impact of paper-based versus computerized presentation on text comprehension and memorization. *Computers in Human Behavior, 54,* 569–579.

Robitzsch, A., Lüdtke, O., Goldhammer, F., Kroehne, U., & Köller, O. (2020). Reanalysis of the German PISA data: A comparison of different approaches for trend estimation with a particular emphasis on mode effects. *Frontiers in Psychology, 11,* 884.

Rockinson-Szapkiw, A. J., Courduff, J., Carter, K., & Bennett, D. (2013). Electronic versus traditional print textbooks: A comparison study on the influence of university students' learning. *Computers & Education, 63,* 259–266.

Salmerón, L., & Llorens, A. (2019). Instruction of digital reading strategies based on eye-movements modelling examples. *Journal of Educational Computing Research, 57,* 343–359.

Singer, L.M., Alexander, P.A. (2017). Reading across mediums: Effects of reading digital and print texts on comprehension and calibration. *The Journal of Experimental Education, 85 (1),* 155–172.

Singer Trakhman, L. M., Alexander, P. A., & Berkowitz, L. E. (2019). Effects of processing time on comprehension and calibration in print and digital mediums. *Journal of Experimental Education, 87*, 101.

Singer Trakhman, L.M., Alexander, P. A., & Silverman, A. B. (2018). Profiling reading in print and digital mediums. *Learning and Instruction, 57*, 5–17.

Wästlund, E., Reinikka, H., Norlander, T., & Archer, T. (2005). Effects of VDT and paper presentation on consumption and production of information: Psychological and physiological factors. *Computers in Human Behavior, 21(2)*, 377–394.

Wolf, M. (2018). *Reader, come home: The reading brain in a digital world*. New York, NY: HarperCollins Publishers.

Sitography

https://ereadcost.eu/wp-content/uploads/2019/01/StavangerDeclaration.pdf, accessed 10/10/2020.

Appendix A: Documentation of the initial prints

Table1: Overview of publications included in this dissertation

Chapter number	Title	Outlet	Status
2	How to measure the social prestige of a Nobel Prize in Literature? Development of a scale assessing the literary value of a text.	TXT 5, 134–143, 2018 (Italian Translation, in Numero Cromatico 11–12 (2020))	Published
3	How much does the symbolic capital of books cost? Operationalizing the prestige of books in the digital age.	Anthem Press	Submitted
4	The mystery of the digital natives' existence: Questioning the validity of the Prenskian metaphor.	First Monday, 23(10), 2018 (Spanish Translation, in CERLARC (2020))	Published
5	Does age determine whether we read e-books?	The Materiality of Reading. Ed. by Theresa Schilhab & Sue Walker. Aarhus, 47–63 (2020)	Published
6	(E-)Reading in a foreign language and dictionary use.	TXT 6, 43–65 (2019)	Published
7	Paper or online dictionary use? Pragmatic learning first. A pilot study on vocabulary knowledge extension in EFL.		Not Submitted

Appendix B: Declaration

I hereby declare that this dissertation is my own original work and has not been submitted before to any institution for assessment purposes. Further, I have acknowledged all sources used and have cited these in the reference sections.

_____ _____

Pasqualina Sorrentino Date